Trains

35¢

June, 1947

Railroads and Railroad Travel — Illustrated

The hand that moves the throttle sometimes needs a voice to govern it . . . a voice that will speak in the night from far down the track and say, "Slow down," "Stop," or "Back up," or "Proceed." Throughout the night the trainman's lantern is that voice.

Wherever there are railroads, the lanterns of railroad men are glowing in the night . . . helping to move passengers swiftly and safely . . . helping to classify thousands of freight cars, and make up trains for speedy routing to destinations.

The passing parade gives little thought to the lantern . . . the still, small voice in the night. But its important work goes on. It is the answer to one requirement of precision transportation . . . it is another of the multitude of "little" things that are vital to railroading — to serve you.

Norfolk and Western Railway

PRECISION TRANSPORTATION

Trains

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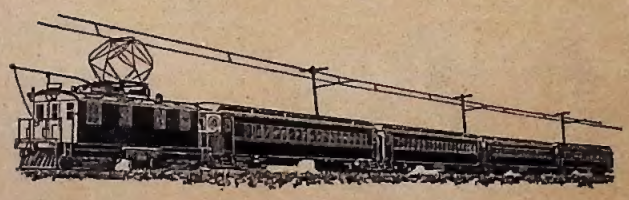

Volume 7, Number 8

June 1947

"Everything that we eat, wear and use, sometime, somewhere, is handled one or more times by the railroads. Although other systems of transportation play an important part in our social and economic life, the development and progress of the nation can be measured in terms of rail transportation."— W. G. Vollmer, President, Texas & Pacific Railway.

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"Train of Tomorrow" Schedule

The widely heralded General Motors *Train of Tomorrow* has been completed and is now on the first leg of a nationwide exhibition tour. The observation dome idea originated in the design of this train, and so did many other novel passenger features. Late in the war General Motors design engineers had finished their wartime tasks and were assigned to work up some railroad passenger equipment completely from scratch. Ideas were put on paper without inhibitions, and the practical details worked out later. The general plan was to help the railroads attract more passenger business, to be pulled, of course, by Electro-Motive locomotives. G. M. has no thought of going into the car manufacturing business, and new ideas developed have been offered freely for use by any railroad or car builder.

The four-car train demonstrating these ideas was built by Pullman-Standard and naturally is powered by an E. M. C. Diesel, single unit, 2000 horsepower. The cars all have lower floor levels under the dome section to give more headroom, unlike the Burlington's experimental vista-dome which was converted from a standard car with single-level floor. The diner has meal service in the dome as well as on the first floor, with a dumb waiter in between. The all-room sleeping car has an observation dome the same as the coach, in effect increasing the lounge space in the train. The observation-lounge car not only has a dome, but the rear observation section is at a slightly higher floor level. An attractive and most unusual bar and lounge fills all but the side aisle of the sunken space beneath the dome.

"Bugs" were worked out of the new equipment following a shakedown trip on the Monon which included numerous braking tests from high speed. New passenger cars are always checked more closely for brake performance than anything else. After adjustments had been made the train went on public exhibition with the following tentative schedule:

Chicago: May 29 through June 2 at Soldier field.
Chicago to Detroit: Will run via Grand Trunk.
Detroit: Exhibition June 5-8.
Detroit to Toledo via B&O.
Toledo: Exhibition June 9.
Toledo to Pittsburgh via B&O with short exhibition stops in Akron and Youngstown June 10.
Pittsburgh: Exhibition June 12-15.
Pittsburgh to Washington via B&O.
Washington: Exhibition June 18-22.
Atlantic City: Exhibition June 23-27.
Wilmington: Exhibition June 28-29.
Wilmington to Washington via B&O, with exhibition at
Baltimore: July 3-6.
Washington to Richmond via RF&P, with exhibitions at
Fredericksburg: July 8.
Richmond: July 9.
Richmond to Atlanta on ACL via
Charleston: Exhibition July 11.
Savannah: Exhibition July 12.
Jacksonville: Exhibition July 13.
Atlanta: July 17-20.
Atlanta to Louisville via L&N.
Louisville: July 24-27.

Twentieth Century Speedup

New York Central has always been handicapped by the difference in time zones between Chicago and New York. It is easy for Mr. Metzman to put a train out of New York after close of business and into Chicago early the next morning. But the two-hour difference in apparent running time eastbound makes it hard to do the same thing for Chicago-New York travel. Further, waiting for connections at the Chicago end is more important than at the New York end. TRAINS suggested at one time that perhaps NYC could reverse the earth's rotation.

Now NYC has done something, and without emulating Joshua. The eastbound *Twentieth Century Limited* and *Commodore Vanderbilt* now make their runs 30 minutes faster than the westbound opposite numbers. The *Century's* eastbound 15 hours and 30 minutes is the fastest Chicago-New York timing ever run, and for the first time the *Broadway* of the Pennsylvania did not match the move. *Century* extra fare is now $5, and the *Broadway* has had no extra fare since early in the war.

Other New York Central trains were also speeded up in the general timetable revision on Daylight Saving Sunday. The *Water Level* is 35 minutes faster westbound, 158 minutes faster eastbound. The *New England States* dropped 50 minutes. A new 6 p. m. eastbound train, the *Mohawk*, adds to service between Chicago, Mohawk Valley cities, and New York.

The faster timings should be made without difficulty. For some months regular passengers have been commenting on the time killed by the *Century* near the end of its run to avoid arriving too early.

Daily Los Angeles Streamliner

Union Pacific's *City of Los Angeles* is now running every day, giving the first daily 39¾ hour coach and sleeping car service between Chicago and Los Angeles. (Santa Fe has been running its *Super Chief* alternate days [except the 31st of any month] for some time, giving a fast schedule daily, but all-coach one day, first-class the next. Both these trains will be daily when new equipment is delivered.)

The UP's move is the second step in a general revision of West Coast timings to furnish daily trains on either 1½-day or 2-day schedules. The 2½-day trains are being eliminated or speeded up, and the

E. L. Thompson, Washington, D. C.

This is a resurrection. Southern Railway abandoned passenger service five years ago on its 112-mile Manassas to Harrisonburg, Va., branch, but put the train back April 27 and had an excellent reception. Photo shows first train leaving Manassas.

Take the Lyrical Route

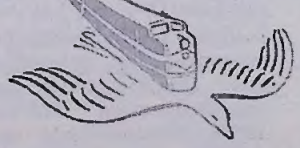
of the CHICAGO-LINERS

Two of America's Finest Postwar Streamliners in daily service between Chicago—Southern Illinois and Evansville, Indiana.

***Regular Coach Fares* bring you *Lounge Car Luxury Comfort* on De Luxe Diesel-Driven Day Coach Trains.**

Heywood-Wakefield photo of famous Sleepy Hollow *reclining chairs.*

Relax in "*FLOATING* COMFORT" all the way



THE MEADOWLARK CHICAGO-LINER in daily service between Chicago and Southern Illinois.

THE WHIPPOORWILL CHICAGO-LINER . . . in daily service between Chicago and Evansville, Indiana.

● Both new *Chicago-liners* are equipped throughout with modern, luxurious "Sleepy Hollow" self-adjusting, reclining chairs. These deep-cushioned recliners literally "lift you off the rails" as the fast, Diesel-powered *Chicago-liners* take wing.

A hospitable diagonal diner . . . an exquisite observation lounge await your convenient pleasure on the Whippoorwill; a sociable grill-lounge on the Meadowlark. Meals at modest prices.

Every beautifully appointed new car on each train is "chuck-full" of the latest in travel facilities and innovations for your comfort and convenience en route. You cannot escape arriving at your destination feeling completely rested, well-groomed, and buoyantly fit.

CHICAGO & EASTERN ILLINOIS RAILROAD SPEED C&EI SERVICE The CHICAGO Line *The Chicago Line*

When Florida East Coast applied to build a new line into Okeelanta Mill, Fla., over route D and Atlantic Coast Line over route B, later route A, the I. C. C. instead proposed joint route C.

tourist cars which featured the slower trains are also going out. Portland service was revised first to meet the new *Empire Builder* time, Los Angeles changes were effective May 14, and San Francisco is no doubt next.

Almost unnoticed in the timetable changes is the obituary of the Los Angeles *Challenger*, original economy train and one of the most successful travel innovations of the depression years.

Also almost unnoticed by the public are numerous minor changes in train timing made by Union Pacific every so often since the general speedup of western service a year ago. UP has lengthened schedules promptly whenever it seemed a train was not making the time and has just as promptly shortened the time again when it could be regularly and safely met. We think this is smart railroading. Dependable performance is far more appreciated by the traveler than a fast timetable with bad on-time percentage.

The Chief Is Faster

One hour and a half will be cut June 8 from the westbound running time of Santa Fe's *Chief*, and 59 minutes from the eastbound time. The new schedule westbound is 46½ hours Chicago to Los Angeles and eastbound 46 hours even. The time-honored Chicago departure time of 12:01 noon is unchanged. At the same time the *Grand Canyon* will be stepped up to 48¾ hours between Chicago and Los Angeles and 55¼ hours to San Francisco through Tehachapi Pass and the San Joaquin Valley.

Transcontinental Passenger Fares Go Up June 1

The increases in eastern basic passenger fares will soon be in effect, but the western roads have decided against changing their basic fares to meet mounting costs. Instead they are making selective increases in a few classes of special reduced fares which were already below the western standard of 2.2 cents a mile for coach and 3.3 cents a mile for first class. The revisions are effective June 1.

H. W. Siddall, chairman of the Transcontinental-Western Passenger Associations, pointed out that the vast majority of western travelers will not be affected by the rate changes. In the few cases where fares are increased, Mr. Siddall said, the western rates will still be as low as or lower than in any other part of the country.

The following fare changes were authorized by the I. C. C.:

Coach class: No change in fares between all points in the western territory, except to the Pacific Coast. There will be a 6½ per cent increase in round-trip and 12 per cent increase in one-way fares to the Pacific Coast. These fares are now on a lower rate-per-mile basis than coach fares between other points.

Intermediate (tourist) class: Round-trip fares between Chicago and the coast will increase approximately 15 per cent. One-way intermediate (tourist) class fares will increase slightly.

First class: Round-trip fares to and from the coast will increase about 15 per cent. Other round-trip fares in the western territory will increase slightly.

The fares between the Midwest and the Pacific Coast have always been lower than the straight mileage because of the tremendous distance. For instance, even with the added 15 per cent, a first-class round trip between Chicago and San Francisco will still come to only 2½ cents a mile instead of the standard 3.3 cents a mile. Further, because of the more liberal routing arrangements on western lines, this same fare will apply on roundabout trips using as much as half again the mileage. Even Jacksonville, Fla., can be thrown into a Chicago-San Francisco round trip for slightly over $30 extra, first class, and the routing via New Orleans, Los Angeles, San Francisco, Seattle, side trip to Vancouver, and east via a northern transcontinental is a popular bargain at the regular short line fare.

No North Coast Speedup

The Northern Pacific people have decided to stay out of the high-speed business with their new *North Coast Limited*. Instead they will sell their train on the basis of comfort, scenery, reliability, and service to intermediate cities.

With the Milwaukee and the Great Northern both putting their crack Chicago-Seattle trains on 45-hour schedules it was getting doubtful whether there would be enough long-distance business to support 45-hour trains on all three northern transcontinentals. The fast timing makes it necessary to add a slower schedule to take care of intermediate stops. Northern Pacific will avoid this expense by keeping the *North Coast* on a somewhat slower schedule, and at the same time its new equipment will still keep it in the running for through travel as well as local business.

UP Cuts Tourist Sleepers

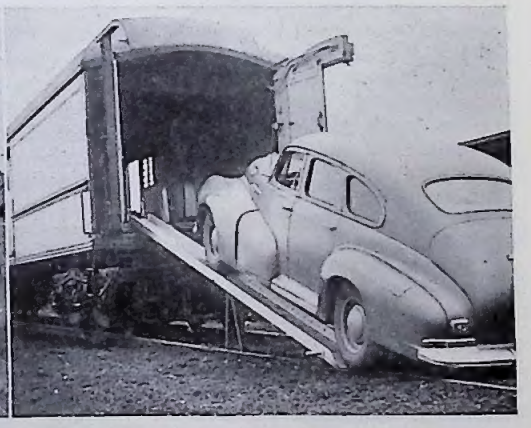
The tourist sleeping car gradually will be eliminated from trains of the Union Pacific and already all tourist cars have been discontinued on trains between Chicago, Denver, Salt Lake City, and Los Angeles or Portland. G. F. Ashby, president, announced that passengers today prefer the cars which operate in expedited service. "With the elimination of tourist cars, passengers will have their choice between Union Pacific streamliner service and modern coaches and standard sleeping cars in regular trains," said Mr. Ashby.

Meanwhile the Milwaukee Road is making a fresh bid for the tourist class business. The new *Olympian Hiawatha* has brand-new tourist sleepers in its streamlined consist and for the first time tourist class passengers can ride in uppers or lowers on one of the fastest transcontinental schedules. The Great Northern continues in the tourist class business, but on the *Oriental*

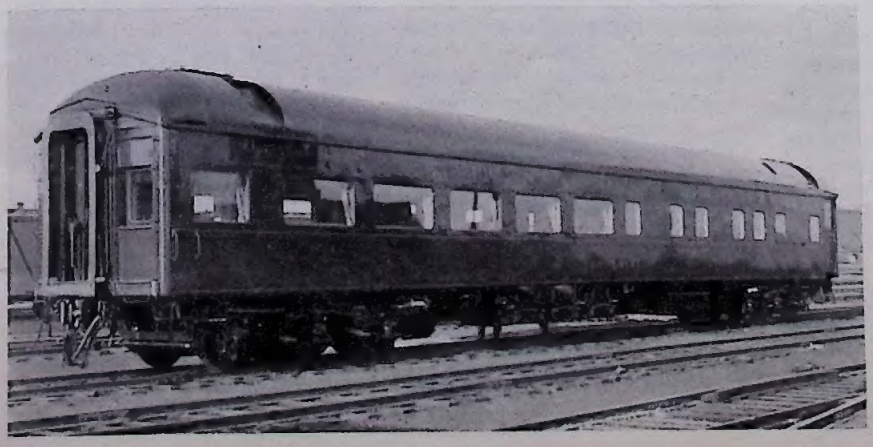
Preston George, Altus, Okla.

NC&StL's new streamliner City of Memphis round trips every day between Nashville and Memphis on a five-hour one way running time. It is pulled by a streamlined Pacific type steam locomotive, and the entire train was built in company shops.

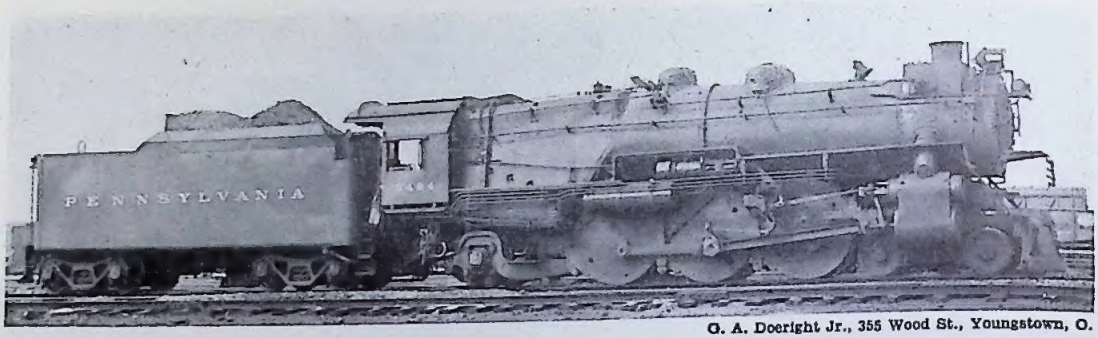
Pittsburg County Railway of Oklahoma is another electric line which has given up operation. Its motor No. 52 is shown switching a mine spur near Alderson, Okla., before abandonment.



Automobiles can now travel on the same trains as their owners over C&O between Cincinnati and Washington. The autos are ready two hours after arrival.



Canadian National is building 20 of these bedroom-buffet-lounge cars in its own shops for use on the Continental Limited, on Montreal-Halifax trains, and also on some of the international trains between Montreal-Toronto and Chicago.



O. A. Doeright Jr., 355 Wood St., Youngstown, O.

Everybody knows the Pennsylvania Railroad K-4 Pacific, one of the most prolific breeds of steam locomotive ever conceived. But with disk drivers, roller-bearing driving axles, front-end throttle, and front-end changes the K-4sa looks different.

Limited rather than the *Empire Builder*. The *Oriental* is made up of the old *Empire Builder* cars.

Tourist sleeping cars have long been an institution in western railroad travel. Except for the new *Olympian* cars they are older, but perfectly comfortable, sleepers with 14 (sometimes 16) sections instead of the usual 12-section and drawing-room arrangement of the standard car. Not only does space cost less in a tourist car, but western transcontinental tickets are sold in three classes: coach, intermediate or tourist class, and first class. The intermediate class round trip from Chicago to San Francisco, for instance, costs only $9.90 more than coach, and $17.96 less than standard first class.

The tourist sleeper has thus given the western roads the opportunity to stress the economy angle to people who do not care to sit up on the three night transcontinental trains and yet cannot afford full first class. Union Pacific's *Challenger*, consisting entirely of coaches and tourist sleepers, was one of the first trains to make full capital of the economy sales motif. The first-class passenger, for his extra money, gets newer equipment, wider choice of schedules, including streamliners, wider choice of space, for tourist cars are confined to uppers and lowers, and the feeling of greater exclusiveness. On most trains the tourist passenger has use of lounge car facilities. Actually the difference is largely one of attitude.

Whether the long-distance luxury coach is sufficient to satisfy the economy stratum of the traveling public remains to be seen. Also, will other roads follow UP's lead in eliminating the tourist class?

New Trains

The Seaboard is now running the *Silver Comet* streamliner between New York and Birmingham. The train carries both coaches and sleeping cars. Coaches and diners are now Budd-built stainless steel cars, but until new sleepers are delivered conventional cars are being used. . . . The Milwaukee's new *Olympian Hiawatha* will begin service June 29. Schedule is 45 hours, with 1:30 departure from Chicago, half an hour after the *Hiawatha* for the Twin Cities. This will make the Chicago-Milwaukee speedway a rail photographers' delight in early afternoon, with the *Chippewa* out of Chicago at 12:30, regular *Hiawatha* at 1, *Olympian Hiawatha* at 1:30, eastbound *Olympian Hiawatha* out of Milwaukee at 12:35 (with a 70-minute schedule for the 85 miles), and the *Morning Hiawatha* at 1:40. The present *Olympian* equipment will be renamed the *Columbian* and run on a slightly altered version of the present schedule. . . . The B&O has added a new morning train between Washington and New York, out of Washington northbound at 7 and out of Jersey City southbound at 7:50.

Illinois Central's new daylight streamliner *City of New Orleans* is now in daylight operation between Chicago and the crescent city. The 921 miles are covered in 15 hours 55 minutes, with 19 stops. Through cars extend service to St. Louis. Each set of equipment includes six coaches, diner, diner-lounge, baggage-dormitory, mail-express, and an observation bar-lounge. Power is a 6000-horsepower E. M. C. Diesel. As with the new *Land o' Corn*, IC beat outside delivery dates by buying standard coaches from Pullman-Standard, while building the special cars in its own Burnside Shops, Chicago. . . . San Diego gets nine hours faster service to Chicago over the Golden State Route and passengers again get a chance to see Carriso Gorge in daylight as a result of new schedules announced by Southern Pacific and Rock Island. The San Diego & Arizona Eastern service now carries a standard sleeper and through coach connecting with the *Imperial* instead of the previous tourist sleeper and coach connecting with the *Californian*.

Locomotive Notes

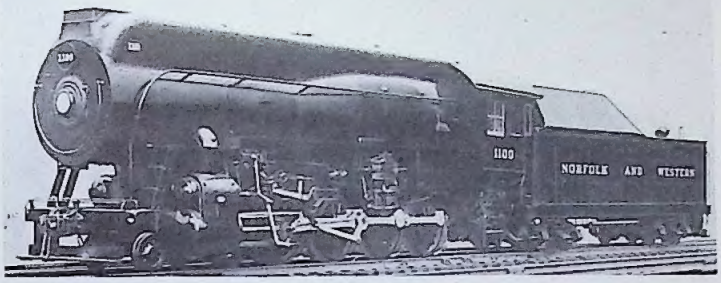
The Pennsylvania Railroad's *Broadway Limited* is now running behind Diesel power. Incidentally, since the *Broadway* became the fastest nonextra fare train between Chicago and New York, it has been doing a heavy business. There was a time in the early '30's when railroad men jestingly called it the "deadhead special." . . . The Missouri Pacific will buy approximately $16 million worth of Diesel-electric locomotives. The 49 locomotives include 111 units of passenger, freight, and switching types, most of them for the Central Kansas-Colorado Division, part of MoPac's main line between St. Louis and Pueblo. Diesels from this order will also be used for the heavy perishable trains in the Rio Grande Valley. . . . Three-unit 4500-horsepower Alco Diesels have been assigned to freight service on the Boston & Albany line over the Berkshires, running between Albany and Springfield.

In an article in *Coal Age*, R. L. Ireland, president of the Hanna

Coal Company, says, "The glamourized Diesel-electric has stolen the spotlight of public interest while the plodding iron horse burning coal is treated as a frumpy wife. Railroad maintenance shops groom the gaily painted Diesel as a thoroughbred, while the steam locomotive is treated like a plow horse. The newest models of coal-fired steam locomotives perform excellently and economically. However, most of the 34,000 steam locomotives in service today were built years ago and, whatever their extraordinary wartime record, are now obsolete in design." He then goes on not only to recommend better maintenance for steam locomotives, but to tell the coal men they should provide better locomotive coal in three grades for various classes of service. . . . A new method of reducing steam locomotive smoke and improving efficiency is the undergrate air distributor, a device which assures more uniform air distribution to all parts of the fuel bed. Road tests indicate fuel savings of 7 to 15 per cent, according to Bituminous Coal Research. . . . Six New York Central Niagara class locomotives have set new world records for steam locomotive mileage. Individual locomotives made monthly mileages of more than 28,000 regularly during the period from October 1, 1946, to March 31, 1947, and the entire group averaged 22,000 miles per month.

New York Central has ordered 70 units of Diesel-electric road power, both passenger and freight, at a total cost of $12 million. When this power is delivered NYC will have 158 units of road Diesel power and 256 Diesel switchers. Many principal trains are now Diesel-powered, including the *Twentieth Century*, *Southwestern Limited*, *Wolverine*, *Knickerbocker*, *New England States*, *Empire State Express*, all in both directions, and the *Commodore Vanderbilt*, *Missourian*, *Lake Shore Limited*, and the *Gateway* in one direction only. . . . Union Pacific has ordered four road Diesel units and three switchers at a cost of $1 million to further the complete Dieselization of the road south of Salt Lake City. G. F. Ashby, president of the UP, says he expects the program to be complete late this year or early in 1948.

The Fort Dodge, Des Moines & Southern has purchased three electric locomotives used on the Oregon Electric before the Portland-Eugene road was Dieselized. . . . The 10 oil-burning steam locomotives which the Pennsylvania has been operating on the Pittsburgh Division were changed from coal as an emergency measure during the coal strike and have no significance in future plans of the road. . . . Saratoga & Schuylerville, 32-mile short line which was formerly a branch of the Boston & Maine, says it is saving $15,000 a year with its 70-ton Alco Diesel. Two largest items in the saving are fuel, $105 a week, and elimination of hosteling, which cost $250 a month for the steamer. . . . Monon now has its first four passenger Diesels, just in time to rescue the service from the steamers, which had been allowed to run out their maintenance in anticipation of retirement. . . . Great Northern is ordering nine 4500-horsepower Diesels for freight and passenger road service. . . . Colonel E. A. Deeds, chairman of the board of National Cash Register Company, is looking for a locomotive, vintage 1850. He wants it for a projected museum in Dayton, O. Anyone knowing of an 1850 engine, preferably inside drive, will please get in touch with Colonel Deeds at N. C. R., Dayton.



Norfolk & Western has built a radically improved steam switching locomotive with larger tender capacity and mechanical lubrication for round-the-clock service, fan for induced draft, and automatic stoker and water level controls so the engine can be left unattended. The loco is in experimental service at Roanoke.

First Monon Line Change

Monon President John W. Barriger's super-railroad line-change program is under way. Routine application has been made to the I. C. C. for permission to abandon six miles of main line and to build a new line between the same two points. This is the Cedar Lake cutoff. At Cedar Lake, just south of Hammond, the present Monon main line goes over a bog on a long wooden trestle. Grades and curves also restrict train speed. A new line slightly to the west will eliminate grades, curves, trestle, and speed restrictions. National importance of the project lies in the fact that it foreshadows the many similar cutoffs which will reduce Monon curves to one degree, grades to one-half of one per cent. This would be the first super-railroad, a guinea pig which may lead the way to a technological revolution in railroad transportation.

A Tank Car Pipeline

Can a railroad compete with a pipeline in hauling gasoline? Texas & Pacific is going to find out. Cosden Petroleum Corporation intended to build a pipeline between refinery at Big Spring, Tex., and the blending terminal at Sweetwater, but T&P secured special trainload rates on gasoline and persuaded the oil company to postpone the pipeline scheme while the railroad found if it could come out financially on the special rate. The experimental period is one year. The trainload rate applies on minimum 20-car shipments and is about 45 per cent of the single-car rate. If the experiment is successful it may mark the turning point in petroleum transportation.

Nickel Plate Gets W&LE

The I. C. C. has approved the control of the Wheeling & Lake Erie by Nickel Plate. The two roads are presently controlled by C&O, but when some Nickel Plate stockholders blocked original C&O plans to merge Nickel Plate and W&LE into its system, C&O

Connecting up the new 4.5-mile cutoff which eliminates grades and curves and shortens the Missouri Pacific main line through Elm Park, near Kansas City.

changed its objectives and will sell its interests in the two roads. It already has approval to sell 78,145 shares of Wheeling common to Nickel Plate. This will result in closer integration of two roads which feed each other at junction points in Northern Ohio, including Cleveland.

New C&O Fast Freight

The Chesapeake & Ohio is running a new fast freight which cuts a full day off the running time between Chicago or Cincinnati and the Carolinas and other southeastern points. The train, No. 90, carries mainly packing house products and other perishables. The No. 90 is pulled by new Berkshire-type engines, some of the 23 already delivered out of an order of 40.

New Milwaukee President

New president of the Milwaukee Road is Charles H. Buford, who has been an employee of the road since 1907. He succeeds Henry A. Scandrett, who retired May 13 at the age of 71. Scandrett had been president since 1928.

Railfan Trips

[Notices must be received by the 10th of the month preceding date of issue.]

June 15: Pennsylvania-Reading Seashore Lines, electrified territory. Camden ferry terminal, 11:15 daylight saving time. Fare $2.75 if sent before June 9 to Joint Railfan Trip Committee, Lackawanna Terminal, Hoboken, N. J.

June 15: Kingston and Port Jervis branches of New York, Ontario & Western. Write Edward A. Hansen, Railroad Enthusiasts, Box 63, Packanack Lake, N. J.

June 15: Rochester Division of Pennsylvania Railroad to Olean and return, down the Grand Canyon of the East. Write Edward Levandoski, Buffalo Chapter, National Railway Historical Society, 18 Kopernik Street, Buffalo 6.

June 15: South Bend, Ind., to Battle Creek, going on freight train, returning on passenger train. Leave 7:30 a. m. Probable fare $4.75. Write E. J. Danch, Northern Indiana Chapter, Railway & Locomotive Historical Society, Room 8, Union Station, South Bend 21.

June 22: Off-the-beaten-path trip on Capital Transit. Special car leaves Union Station, Washington, 10 a. m. standard time. Write C. J. Murphy, Electric Railroaders' Association, 1522 White Place N. W., Washington 20.

June 29: Pennsylvania Railroad circle route trip including Maryland & Pennsylvania Railroad, Philadelphia to Baltimore, York, Lancaster and return. Fare about $5. Tickets must be purchased by June 25. Write National Railway Historical Society, Henry Dickinson Jr., 109 W. Ashland Avenue, Glen Olden, Pa.

June 29: Boston & Maine scenic freight route to Hillsboro, N. H., with grades, sharp curves, high trestles and covered bridges. Photo stops, including enginehouses. Leave Boston North Station 9 a. m. daylight saving time. Send $3.87 in advance to Cyrus Hosmer Jr., New England Division, Railroad Enthusiasts, 34 Chester Road, Belmont 78, Mass.

June 29: New Haven open trolley excursion. Leaves James Street car station 9:30 a. m., railroad station 10:30, daylight saving time. $1.25 in advance, $1.75 on trip, women and children free. Write Connecticut Valley Division, ERA, Eugene Hermann, 506 Old Stratfield Road, Bridgeport 5, Conn.

July 4 week end: Three-day inspection of railroad facilities at and near Montreal. Starts at McGill Street station, Montreal & South Counties Electric, 8 or 8:45 a. m. July 4. Cost before June 28, $5.75, $4.75 extra for optional Cornwall side trip. Write Joint Railfan Trip Committee, Lackawanna Terminal, Hoboken, N. J.

August 10 through 23: Special train from Chicago to Oakland, Calif., for National Model Railroad Association convention. Routing specially planned for railroad points of interest, including side trip on narrow gauge to Marshall Pass and daylight stops at many operating and scenic points such as Royal Gorge, Keddie, Williams Loop, Tennessee Pass, Cajon Pass, Glorietta Pass, Raton Pass. Stopovers at Denver, Salt Lake City, Oakland, Los Angeles, Grand Canyon. Dead line July 1. Some space may be available for non-members. Write E. H. Beck, 921 Fox Theater Building, Detroit 1, Mich.

He's No Authority at All

I was riding the Monon the other day when we passed one of the new passenger Diesels on its maiden run. That started me on a discussion with Brakeman "Gloomy Gus" (he's just the opposite) Calhoun about the relative virtues of modern Diesel and modern steam locomotives. He didn't know me from Adam, and first thing I knew he'd run off to the end of the car, rummaged in his grip, and came back with a copy of TRAINS, from which he quoted me to prove his side of the argument. All of which proves that a guy can get into trouble by maintaining that there's much to be said on both sides.

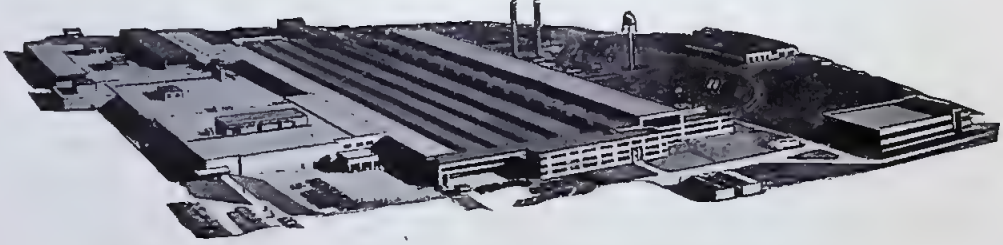
A. C. Kalmbach.

The New River Train

Three miles north of Hinton, W. Va., a westbound Chesapeake & Ohio string of empties follows engine 1603 (2-6-6-6) along the west bank of the New River. First westward-flowing river to be discovered in North America, the New is unusual in that it is wider upstream than it is at its mouth, where it joins the Gauley River to become the Great Kanawha. This is the route of the C&O's crack *George Washington*, *Sportsman*, and *F. F. V.* trains, and the locale of the song "The New River Train" which was sung in all theaters of World War II from an army song book. Photograph by B. F. Cutler, Rail Photo Service, 93 Massachusetts Avenue, Boston 15, Mass.

RAIL ROAD
CROSSING
LOOK OUT FOR LOCOMOTIVE

WELLSPRING OF DIESEL PROGRESS

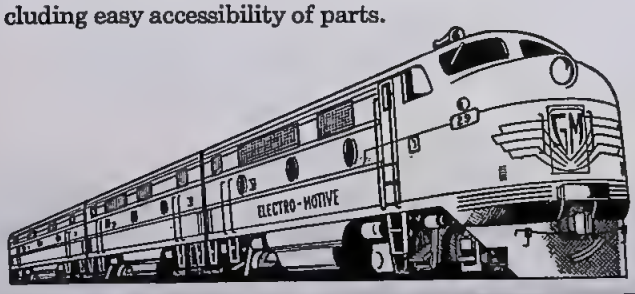


General Motors Diesel locomotives have been produced at the Electro-Motive plant, shown above, since its completion in 1936. Today this plant covers 54 acres, and is still being expanded to meet the railroads' growing demand for this new and modern power.

The Electro-Motive plant is also the home of countless Diesel improvements and developments — among them, improvements in the Diesel engine, in traction motors and generators, in controls, in brake and cooling systems and many others, including easy accessibility of parts.

A major development is the new, versatile, wide range F3. It has more thoroughly railroad-tried features than any other locomotive ever built. Eighteen months of successful demonstration on 30 important railroads has proven its superiority in all kinds of service.

In fact, Diesel specialist engineers aided by advanced manufacturing methods see to it that *every* General Motors Diesel delivers that high quality of performance which makes them natural pace-setters in advanced locomotive design and operation.



GENERAL MOTORS LOCOMOTIVES

ELECTRO-MOTIVE DIVISION

GENERAL MOTORS LA GRANGE, ILL.

The Steam Turbine: Coal's New Hope

Still in experimental stage, geared turbine has many future possibilities, including dual-service locomotives of greater boiler capacity

BY CHARLES KERR JR.*

The steam locomotive has been the backbone of our rail transportation system for more than a century. Today, without question, it is receiving the most severe competition of its long and useful career. I can remember predictions before that the steam locomotive was dead, and we all hear the same predictions today. But if we stop and review the history of steam power we find that competition has always caused the steam designers to sharpen their pencils and they then come up with steam locomotives better than any before.

Such a situation exists today. Around 1940, the Pennsylvania Railroad, the Baldwin Locomotive Works, and the Westinghouse Electric Corporation undertook the design of the first geared turbine locomotive. Our assignment was to design the largest capacity unit that could be built with four driving axles and meet weight and clearance restrictions. In late 1941, designs of a 6900-horsepower 4-8-4 locomotive were completed. But before authorization to proceed with its production was received the country was at war. When final War Production Board approval did come, it was specified that no alloy steel could be used except the relatively few pounds required in the propulsion equipment. To avoid a reduction in power, recourse was then taken to a 6-8-6 wheel arrangement.

In many respects this was an extremely daring undertaking. In the initial development of an entirely new type of locomotive, the participating parties undertook to build the world's largest passenger locomotive in horsepower rating. I feel that all who participated in this venture can be permitted to feel pride in their accomplishment.

The turbine locomotive offers certain potential advantages which may ultimately have a profound influence on the future of steam motive power. Taking a long-range view of these possible advantages, I consider four to be the most outstanding:

1. The turbine drive may ultimately permit a far greater selection in the arrangement of the various parts of a steam locomotive and thus remove certain restrictions which are inherent in reciprocating practice. These possibilities have not yet been fully explored.

2. The turbine drive will provide an effective means to use high pressures and high steam temperatures, and should stimulate development of boilers of this type.

3. Elimination of reciprocating parts will result

*Adapted from an address by Mr. Kerr, consulting transportation engineer of the Westinghouse Electric Corporation, before the Milwaukee Chapter, American Society of Mechanical Engineers.

Remember how mother used to cover the lower portion of Willie's portrait and say "See the resemblance to his father"? Try that trick on this view of the Pennsylvania S-2 and it has a striking resemblance to a conventional steam locomotive. But below the running board its differences are quite pronounced. The entire power output comes from the small turbine between the second and third drivers, eliminating main rods.

It is easy to control the S-2 by means of the gearshift style throttle lever, which the engineer has moved to forward position. To back up he merely pulls lever to the left and rear.

Pennsylvania RR.

in a vehicle whose tracking qualities will be equal to any other type.

4. Either mechanical or electrical transmissions can be used, affording a selection in drive to meet varying operating needs.

Those are possibilities. Now let us consider some of the proved features of the first turbine locomotive, the Pennsylvania Class S-2:

1. The locomotive is geared for a maximum of 100 miles per hour, and with this gearing it is best suited to high-speed passenger or freight service. Starting tractive effort exceeds 70,000 pounds and a maximum wheel output in excess of 6500 horsepower is developed. To my knowledge, no other self-propelled passenger locomotive can develop this output at 70 miles per hour, whatever its type may be.

2. Compared with a conventional steam locomotive of equivalent boiler capacity, the turbine drive increases the output from the same amount of steam by approximately 800 horsepower.

3. Above 35 miles per hour the wheel output of the turbine locomotive is considerably in excess of that of the Diesel. Thanks to its electric drive, the Diesel is considerably better at low speeds.

4. On a special test run, this locomotive handled 17 cars for more than 30 miles in excess of 105 miles per hour, and these were not lightweight cars nor was the run downhill.

This particular arrangement of the turbine locomotive provides an excellent high-speed locomotive for roads with favorable grades where four driving axles are ample to meet requirements of traffic. It is definitely not a locomotive for slow, heavy-grade service and was never intended to be suitable for such. In the present state of development, the field of the geared turbine economically lies in locomotives of high capacity for mainline service, and there seems to be no field for it in capacities below 4000 horsepower for lighter assignments.

The boiler of the S-2 is a standard fire-tube unit, operating at 310 pounds pressure with a maximum steam temperature of 750 degrees. Exhaust steam produces the draft, just as in conventional locomotives. A high-pressure boiler and condenser would doubtless increase the efficiency of the locomotive, but it was considered inadvisable to attempt two major developments simultaneously, so our efforts were confined to the turbine.

The main propulsion equipment consists of a forward turbine, a reverse turbine, double reduction gearing, and flexible cup drive. The forward turbine, rating 6900 shaft horsepower, drives the high-speed pinion through a quill. It is never disconnected from this pinion. At full power, the turbine requires 95,000 pounds of steam per hour at 285 pounds pressure and 750 degrees temperature, and exhausts at 15

Pennsylvania RR.

Ira H. Elgstl; Rail Photo Service, 93 Massachusetts Ave., Boston 15, Mass.

One thing the S-2 does not have that conventional steam locomotives do have is the familiar "chuff-chuff" of the exhaust. Lacking reciprocating pistons, the S-2's steam flow is continuous through the turbine and the sound it emits is a steady "whoosh." Here the 6200 turns in a good performance on an eastbound train near Warsaw, Ind. Smoke deflectors were added later.

pounds back pressure. The reverse turbine, which is clutched and declutched, develops 1500 horsepower and an extra gear reduction is provided to obtain full tractive effort. The reverse turbine can be engaged only when the locomotive is not moving.

The turbines work on the second and third driving axles and power is transmitted to the first and fourth axles by side rods.

The entire propulsion equipment weighs approximately 39,000 pounds, or less than six pounds per horsepower. No traction propulsion equipment has ever before been built with such excellent weight efficiency. The main turbine alone weighs 5000 pounds, or less than one pound per horsepower.

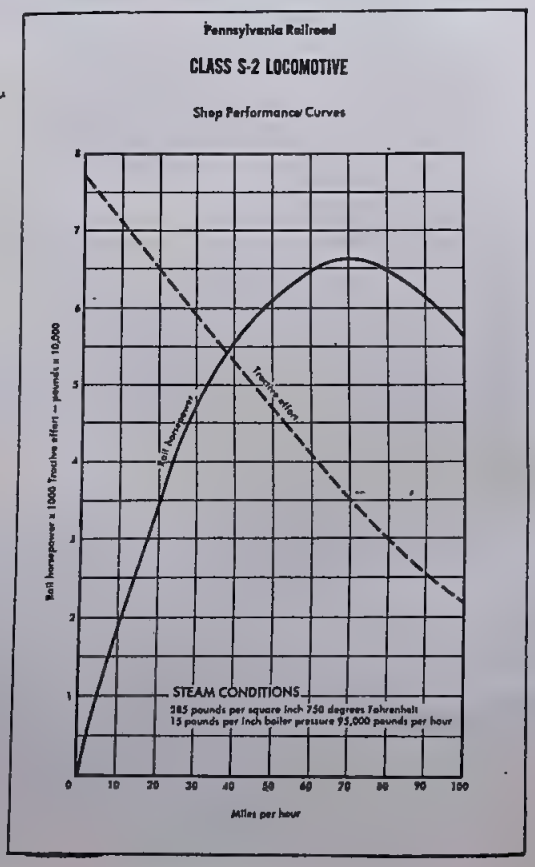
As far as the engineer is concerned, this is the simplest locomotive ever built to control. It has one lever operating in a "Z" slot similar to the gearshift on an automobile. The handle is moved forward for forward operation; to reverse it is merely moved through neutral and then backward.

One of the most difficult problems in the design of the locomotive was the flexible cup drive — in reality, a misalignment coupling. Devices of this character have been used for many years on electric locomotives, but never before had one been completely buried in the gearing nor had one ever been called upon to deliver equal power.

In a few months the first coal-burning turbine-electric locomotives will enter service on the Chesapeake & Ohio, introducing another new type of steam motive power. These locomotives are being built for passenger service between Washington and Cincinnati, a territory where long, severe grades are encountered in some portions and where fast speeds are demanded in others. This class of operation is ideal for electrical transmission.

In general, the performance of the turbine-electric will resemble that of the Diesel-electric locomotive, and with prime movers of equal capacity should be essentially the same. However, in some respects the design of the electrical equipment is made easier than in Diesel practice. Generator speed is not limited by the prime mover; consequently, higher speed, lighter weight generators can be built. As turbines maintain almost constant horsepower over a wide speed range and will not stall if overloaded, control is somewhat simplified. The present accepted control of locomotive speed involves a variation in turbine speed together with a variation in generator excitation.

In appearance the new C&O locomotives will be quite different from conventional steam locomotives. At the front of the locomotive will be the coal bunker, carrying 30 tons. Following this

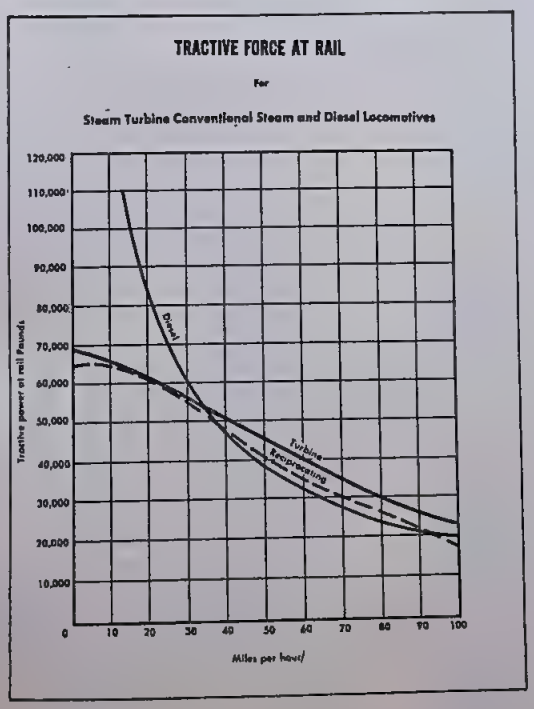


will be the operator's compartment, then the boiler, which is arranged with the firebox forward. The power plant compartment will be at the rear of the smokebox and will contain the turbine-generator and electrical control equipment. The tender will carry only water.

The turbine will drive two direct current generators which will supply current for eight traction motors, identical to those used on Diesel locomotives. However, the turbine-electric locomotive is designed to produce 6000 horsepower, more than has ever before been produced with only eight traction motors, and compared with a 6000-horsepower Diesel the turbine locomotive will develop its continuous rating at a higher speed. In other respects its performance will be quite similar to that of a 6000-horsepower Diesel-electric locomotive.

Naturally, as these locomotives have not yet been placed in service, no operating records are available. It is my belief that they should give very little trouble, for all component parts have a wide background of operating or engineering experience. Troubles should be confined to those minor items which always occur in any new combination of equipment.

The S-2 turbine locomotive's performance curves, based on shop tests, are given in chart at left. Below, the tractive force at rail is plotted, using as comparisons a conventional steam locomotive of identical steam capacity and a Diesel-electric of 6000 engine horsepower.



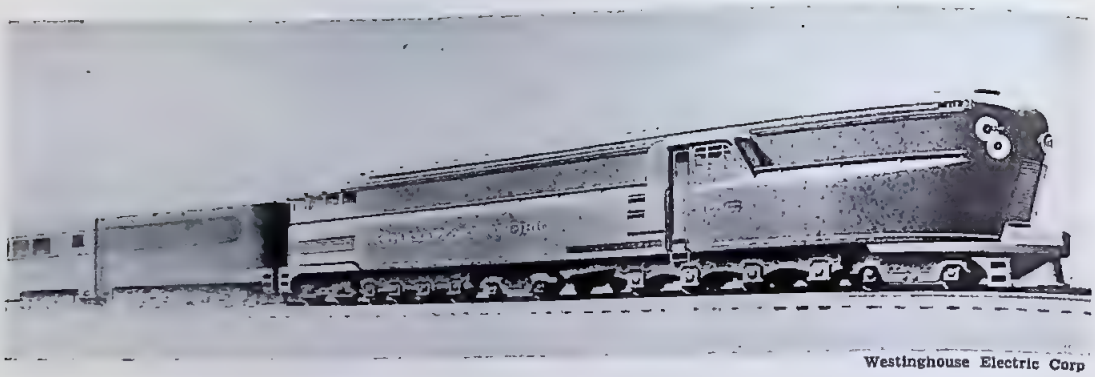
The turbine-electric locomotive has considerable possibilities as a heavy-duty freight unit. Many heavy-traffic lines lie in regions where coal is definitely the preferred type of fuel, and for these roads electric drive gives promise of producing freight power which can match the performance of modern Diesel locomotives.

One limitation of the steam locomotive has been the necessity of using side rods and large-diameter driving wheels. These have limited the selection of wheel arrangement and, most important of all, the large wheels have reduced the space available for the boiler, which, after all, is the ultimate limit of capacity. Work is progressing on a geared turbine drive to remove these obstacles to the steam locomotive. This drive will permit 48-inch drivers to be used, irrespective of the maximum speed desired, and will substitute a longitudinal shaft and bevel gearing to take the place of side rods. A reverse gear may be incorporated in the high-speed reduction to eliminate the reverse turbine. Furthermore, with the proposed type of reverse gear, a different gear ratio could be provided, if desired, in two directions of operation.

A geared turbine drive of this character would permit radically new types of steam power to be built, utilizing the truck type of running gear which has proved so satisfactory in electric and Diesel-electric practice. In a locomotive of this type it seems practical to develop approximately 9000 horsepower. Two turbines would be used, one on each truck.

This same arrangement of geared drive would make an excellent 4-8-4 locomotive in which the wheels would be small, the rigid wheelbase shortened, and side rods eliminated. The turbine could be located under the smokebox, simplifying the piping. The small wheels would afford far greater space for the boiler than ever before enjoyed in steam practice, indicating a unit with improved characteristics and better over-all efficiency. With generally permissible wheel loads, at least 6000 horsepower could be provided in a 4-8-4 wheel arrangement.

The third application of this drive is an attempt to provide the ideal universal freight and passenger locomotive. With small wheels, six driving axles could be introduced into the same over-all wheelbase now taken by fewer axles. The tender could be redesigned to be either pushed or pulled, employing an arrangement of wheels to permit this kind of operation. The reverse gear would provide a different



Westinghouse Electric Corp

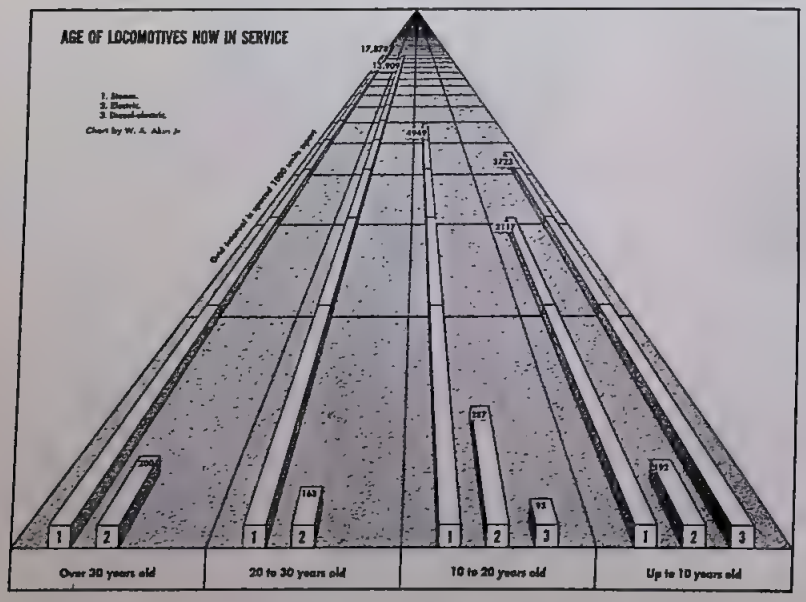
Artist's conception of Chesapeake & Ohio's projected turbine-electric engine. Coal is carried in nose, water in tender.

gear ratio in the two directions of motion. Running with the engine forward, the locomotive would be a 120-miles-per-hour passenger unit; with the tender forward, a 70-miles-per-hour freight unit providing improved characteristics in the speed range common to freight service. With six driving axles, sufficient boiler capacity could be carried to develop 8000 to 9000 horsepower without excessive wheel loads.

One other future possibility of the mechanical drive is a gearshift. Designs of a gearshift have been made, and this equipment for a large-capacity locomotive is quite small. Turbines operate at extremely high speeds, the feature which provides the small space requirement. A gearshift would make possible, on eight axles, a maximum tractive force of 140,000 pounds, an output in excess of 7500 horsepower from 20 to 100 miles per hour, and almost constant steam consumption over the operating range. A single locomotive of this type would be suitable for any type of rail service — drag freight, high-speed freight, or passenger.

The ultimate status of the steam locomotive is hard to predict. Some feel confident that its day is done. Others feel that any road which buys anything but a steam locomotive is a victim of supersalesmanship. My own feeling is largely this:

The steam locomotive today is a remarkably effective means of moving rail traffic. It has a background extending over a century. Admittedly, it has its faults, but it also has many proved virtues. High on this list of virtues are its low first cost and its ability to burn either coal or oil. I think it would be unfortunate for the American railroad industry if development in steam power did not continue to keep pace with developments in other types of locomotive.



According to latest I. C. C. figures (December 31, 1945), this chart shows the number of locomotives of various ages now in service on the railroads of the United States. Out of a total of 43,530 locomotives, 38,583 are steam-operated; 842 are electric; and 3816 are Diesel. Most of the Diesel engines are under 10 years of age, while 45 per cent of the steam locomotives now in service are over 30 years old. Two-thirds of all Diesel locomotives are used in switching service, while two-thirds of the steam locomotives are used in freight service. The trend in switchers is to Diesel, but there are still three times as many steam switchers in service as Diesel. Note — This chart omits 19 locomotives of types other than the three basic classes.

Los Angeles Division, AT&SF

487 miles of main and branch lines cross high mountains, arid deserts; serve agricultural and industrial districts of West Coast

BY TOM BAXTER

It's 12 noon, straight up, in the big Union Depot in Los Angeles, and the Santa Fe *Chief* has only 60 seconds more before it starts its first lap on the way to Chicago. At 12:01 p. m. the Diesel-powered streamliner will begin to roll and for the next 3 hours and 44 minutes it will be on the Los Angeles Division of the Santa Fe Railway. In that time the *Chief* will cover some of the most varied country crammed into any stretch of track of comparable length in the land: through the verdant uplands along the foothills of the San Gabriel Mountains, through the highways and byways of the small towns between Los Angeles and San Bernardino, blasting up the famous Cajon (pronounced ka-*hone*) Pass, and roaring across the flat, arid mesas of the Mojave Desert into Barstow.

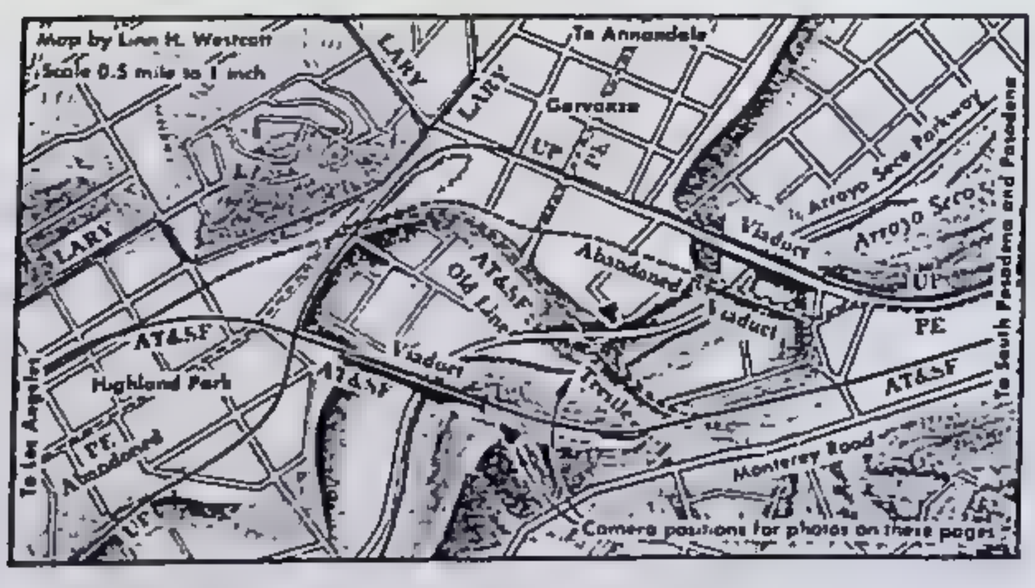
Much of this is historic track, surveyed, laid, and used in step with the march of the pioneers whose coming heralded the future of Southern California, but let's look at the Los Angeles Division today. It includes 321.6 miles of main lines and 165.2 miles of branches, making a total of 486.8 miles in all. The main lines are divided into four districts, the first, Barstow south to San Bernardino, being the double-track route which drops from the desert to the fertile coastal valleys through Cajon Pass. The second district heads due west from San Bernardino close along the foothills of the San Gabriel Mountains to Pasadena, then southwest into Los Angeles. The third district also has San Bernardino and Los Angeles as its limits, but it takes a 10-mile longer course south through Riverside, Corona, and then west through the Santa Ana River canyon and Fullerton, making a low-grade route used mostly by main line through freights. The fourth district leaves the third at Fullerton and winds southeast along the coast to San Diego.

The Santa Ana shares a large part of its Los Angeles Division with the Union Pacific. The entire first district and 10 miles of the third carry the schedules of the Union Pacific trains as well as those of the Santa Fe. The Union Pacific leases this right of track on a car-mile basis and a prorated share in the upkeep. Employees' salaries along this joint track are paid equally by both roads, and the telegraph operators here work

Fletcher Swan, South Pasadena, Calif.

The San Bernardino roundhouse is always busy. Here engines 1976 and 3892 (on turntable) are being prepared for assignments; No. 3859 has just returned from helper duty on the hill.

Collection of C. C. Pierce, 1572 W. Pico St., Los Angeles, Calif.



Between Pasadena and Los Angeles the second district main line crosses Arroyo Seco to Highland Park↙. The old line, built by the Los Angeles & San Gabriel Valley Railroad, crossed on a timber deck truss ↑, shown in 1885 with a train headed west. Years later an awkward dip was eliminated by a new all-steel viaduct located 2000 feet downstream at a higher level↗.

with both their own Santa Fe dispatcher and the Union Pacific dispatcher, although the latter does no dispatching and merely records the train times.

Let's start with the first district from Barstow to San Bernardino. Barstow is the eastern terminus of the Los Angeles Division, and it is here that the Arizona Division takes over. The San Francisco line running northwest from Barstow to Mojave and thence over the Southern Pacific to Bakersfield is also operated as a part of the Arizona Division, and as such does not concern us now.

Barstow is located on the south side of the Mojave River, which the Santa Fe follows as far south as Victorville, and the town itself was the scene of a great deal of wartime expansion for the Santa Fe. Not only were the yards greatly enlarged, but a new building housing shops and maintenance facilities for the huge fleet of Diesel freight locomotives was built. Like most division spots on the Coast Lines, Barstow is not what it once was from the standpoint of the engine picture fan. Where before was a constant parade of heavy freight locomotives in and out along the roundhouse lead, now passes only an occasional switcher, the engine for a San Francisco passenger train, or one of the big freight engines relegated by the Diesels to mere helper assignments; and the once crowded roundhouse looks strange with only four or five tenders protruding.

Heading west on the Los Angeles Division out of Barstow, the tracks cut sharply to the left around the bluff behind West Yard Tower and strike out to the southwest. It's heavy-iron, double-track right of way, and in quick succession the small boxlike depots with their passing tracks and order boards fly by. The land is rolling, with green alfalfa fields and barren, rocky land alternating with almost clocklike regularity. To the south lie the peaks of the San Bernardino and San Gabriel mountains, so we know, though gentle, the grade is rising, but not enough to slacken the pace of the high-steppers; this is the race track of the division.

At Victorville the grade begins in earnest, much of it 1½ per cent for the 19.1 miles to Summit. Nearly all westbound freights and many of the heavier passenger trains pick up helpers here and the dispatcher is kept busy sending light engines east from Summit to boost the westbound trains. Seldom is Victorville without three or four heavy Santa Fe and Union Pacific locomotives idly waiting their turn against the mountain.

Just south of Victorville are the narrows of the Mojave River. It is here that in the flood of 1938 the Santa Fe suffered extensive damage, and today many evidences of flood control can be seen. Farther on, the tracks separate as the eastbound main line pulls away, ducks under the westbound and rejoins it on the other side. From this point into San Bernardino the

Wendell H. Kinney, 200 N. Avenue 18, Los Angeles 31, Calif.

first district uses left-hand operation. An old skeleton of a hotel and a lone gasoline station on the sandy wastes proclaim at once Hesperia's approach and passing — there are the passing tracks at Lugo — then the yard limit board at Summit.

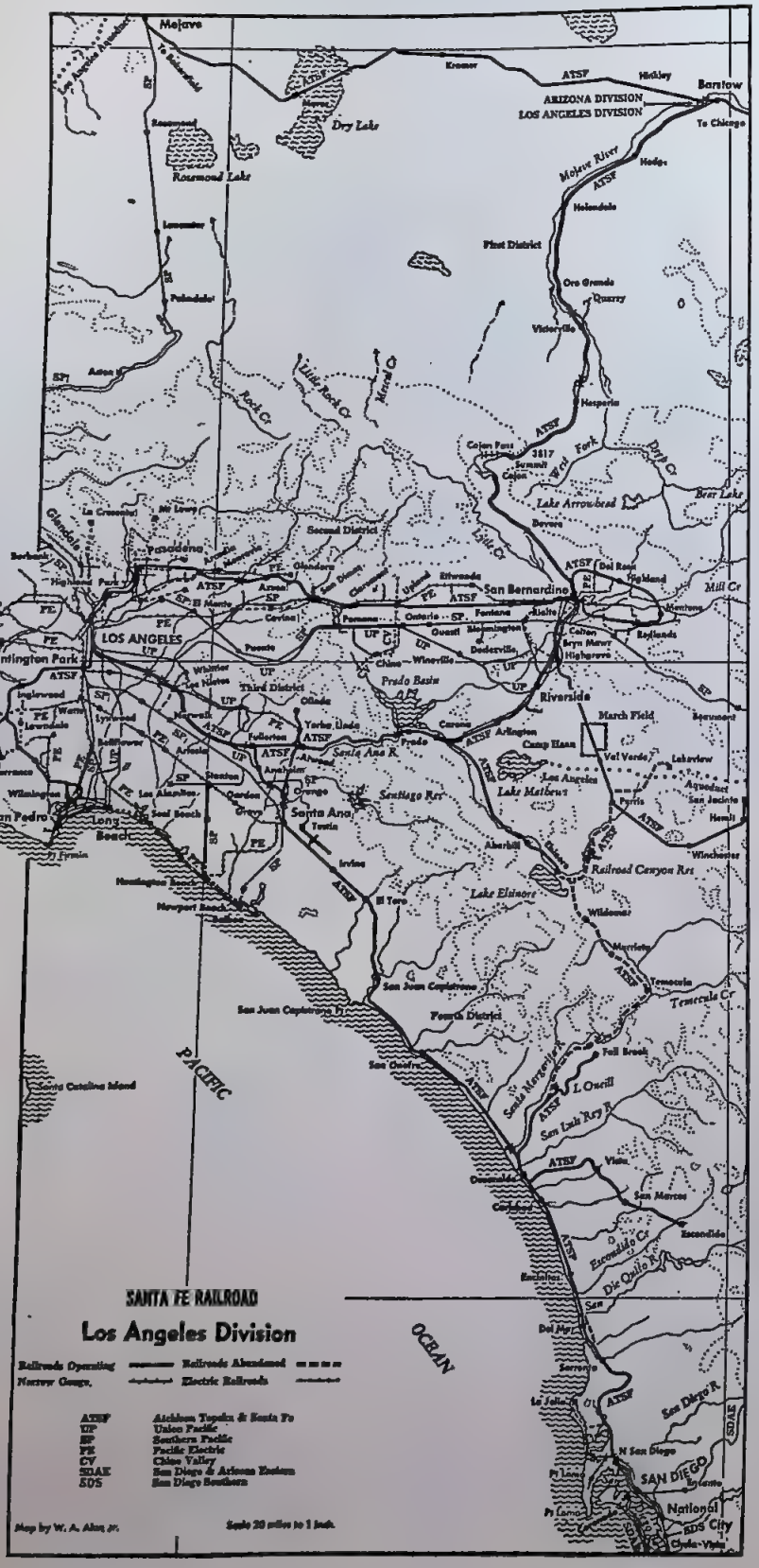
Summit is undoubtedly one of the hottest spots on anybody's railroad. Unless the observer happens along at a very slack time, there will be at least a few locomotives waiting for reassignment, perhaps a train in one of the passing tracks, another cutting off his helpers, and the big lighted "TRAIN" sign at the west end notifying all concerned that there's somebody coming up the hill, and close.

Just a tiny post office with its overalled postmistress, a few frame houses for the railroad personnel, and the small square depot comprise the inroads of civilization at Summit. The land slopes away to the east and one can look down Summit Valley and Horsethief Canyon along the back road to the famed resort of Lake Arrowhead.

Although Summit has always been a busy place, during the war even the seasoned old railroaders had to admit it was fantastic. Sandwiched in among the already abnormal freight and passenger traffic were sometimes, in rapid succession, seven or eight sections of a troop train with their helpers, all to be cleared at Summit. But it is calmer now. On a typical day now there are only 128 entries on the block record in the 24-hour period. Of these entries, 45 are helper engines, sometimes several coupled together into one train of engines. The balance are through trains, both Santa Fe and Union Pacific. And don't forget these trains are being boosted to almost 4000 feet over a thoroughly tough mountain pass where speeds are necessarily limited and power heavy. That's railroading in any man's language.

All trains in both directions are required to stop at Summit to make an air brake test before proceeding down the mountain, so let's climb aboard the next westbound and ride down the pass. We greet the sight that crawls toward us out of the cut at the east end with surprise, for we were expecting one of the ever-present Diesels. Instead, it's a big Santa Fe type, the 3879 with the old 3014 helping from Victorville. We climb aboard while the 3014 cuts off and pulls quickly away through the crossover into the siding to await orders. We stand a long time for what seems to be nothing at all until the engineer informs us the brakemen are turning up the retainers. At last we whistle off and carefully nose through the steep cut and around the sharp curve at the west end and feel the first pull of the three per cent grade. Almost simultaneously we hear the roar of air and there's an anxious moment while the 3879 surges against the push of the heavy train, but it soon checks and we are on our way.

Just west of Summit the tracks divide, the eastbound climbing toward us by a more roundabout way to hold to a 2.2 per cent grade, the westbound being much steeper but two miles shorter. It is the older of the two lines, having been built originally in 1885, while the



eastbound was constructed when the double track was laid from San Bernardino to Summit in 1912-13. The two tracks are seldom out of sight of each other, however.

The three per cent grade we are now descending holds almost without break until we reach Cajon station and the brakes on our westbound drag really have a job to do. Constantly applying and releasing, by the time we have gone the 6.5 miles to Cajon, every wheel is a smoking disk that at night would be cherry red with streaks of flying fire.

Just above Cajon station the two main tracks come together, the eastbound coiling in from the right on a sweeping arc. Up along the eastbound we can see the two huge rocks that have made Cajon Pass so famous in the albums of railroad photographers.

On July 15, 1923, the Los Angeles & Salt Lake (now UP) 6035 was wheeling a train of hopper cars, all loaded to the brim with coal, along this very stretch of track. She stopped just below Summit to take down a brake beam when the brakes lost their hold and the train didn't stop again until it was a few thousand feet above Cajon. I have been told unofficially that parts of the 26 derailed cars are still there scattered among the sage bushes, and after reading reports on the entire affair it is not hard to believe.

We stop at Cajon for 10 minutes to cool our wheels and to let the brakemen change the retainers. This stop is mandatory on the part of all westbound freight trains.

From Cajon station on down the hill we can again see steps the railroad has taken in its never-ending war against water. In the 1938 flood more than a mile of right of way was washed out in the Cajon, and much of it — rails, ties, spikes and all — has not yet been found. Down through Blue Cut the track winds on a recently relocated route, and we swing around the curve above Keenbrook.

Curves gradually get easier, but the grade holds. We make

another 10-minute wheel-cooling and inspection stop at Devore. The Diesels with their dynamic brakes in operation often omit this delay. At Verdemont we come out on the long straightway heading southeast into San Bernardino. For six miles the track drops straight as a string with the 2.2 per cent grade never slackening. We pass the huge Army Engineer Depot at Ono; there's an easy curve to the left, a sharper one to the right, and we are almost in San Bernardino. We cross the switches at Highland Junction where the Redlands Loop comes in, pass Fifth Street Tower, take the curve into the yards, and with wheels still smoking, come to a stop. We have dropped 2800 feet from Summit.

The town of San Bernardino is practically the Santa Fe Railway. When the railroad came, it was but a small Mormon settlement, but now it is a large, well-populated town. Here the Santa Fe located the largest shops on the system next to those in Topeka, built a large roundhouse and settled its division offices. Just recently it extended the yards still farther, and finding the roundhouse too crowded to take care of two railroads, moved the Union Pacific into a smaller structure of its own on the south side of the freight yard. The extensive shops here are able to handle about 30 complete locomotive overhauls per month, and they share in the car building and remodeling campaigns, too.

Looking westward from San Bernardino we have a choice of the two main lines to Los Angeles, but let's take the second district for now and come back on the third district. Almost before we are out of the yard limits at San Bernardino we are in the orange groves, and the sidings and spurs are lined with packing plants at many of the small towns through which the single track passes. Just to our left after we pass Fontana is the new Kaiser steel mill, served by the Santa Fe. During the war a twice-daily coal train was run to Kaiser, each time returning with empties, but this run is no longer regularly made, as the business can be handled by the locals.

We are now on the longest tangent track on the Los Angeles Division, some 13 miles without a curve. This crosses the largest vineyard in the world, the huge Cucamonga Winery, and the flanged wheels really roll. Only a few miles apart, the small towns seem to flow together in a steady stream: Upland, Claremont, Pomona, and La Verne. Although it's still high-speed track, little time can be made now because of the numerous grade crossings, the density of the population, and a few 15-miles-an-hour speed limits imposed upon rail traffic by conservative city fathers years ago.

Through green hills and across palm-lined highways the iron pathway leads, curving slightly this way and that but seldom deviating

H. Eichstaedt.

Both, Fletcher Swan.

Relic of the past is the partially boarded up station↑ at Devore, 10 miles east of San Bernardino. Once planned to be the main line, this old roadbed↗ lies near Lake Elsinore. Present end of old branch from Fallbrook to Temecula is weed-grown→.

East of San Dimas the grade rises, then drops, and trains are not visible at the station or the Pacific Electric interlocking tower in San Dimas. To inform passengers as well as railroad men that a westbound train is approaching, this signal goes into operation. A similar train signal is used at Summit.

William W. Turkington, 121 E. Avenue 39, Los Angeles 31, Calif.

from a due-west course. Bearing slightly to the north at Monrovia, the track then passes through Arcadia above the famous Santa Anita race track and plunges into the back yards of Lamand Park and Pasadena. Now the crossings are so close together that one whistle blast can be made to do the work of several. We pause at the modern Spanish style depot in fashionable Pasadena, and then, turning south and southwest, follow the course of the Arroyo Seco into Los Angeles. At Broadway we come onto double track and soon pass Mission Tower, where we swing right onto the six-track throat of the new Union Depot, or if we are only a lowly freight, continue a mile or so down the banks of the Los Angeles River to the yards on the site of the old La Grande passenger depot, long since torn down and now known as First Street. A small building serves as telegraph and yard office for the adjoining yards.

Between Mission Tower and First Street the double track presents some very unusual aspects of train operation. The second and third districts combined form a pear-shaped loop with San Bernardino as the stem and Mission Tower and First Street at the base of the pear. With both districts using both depots as terminals, it is possible for two trains to pass each other on the double track in opposite directions yet both be bound eventually for the same point, San Bernardino.

The Santa Fe facilities in Los Angeles are not so extensive as those in San Bernardino. There is a large roundhouse to handle the rapid turnover of power, but little in the way of shops or offices for the division. In downtown Los Angeles, however, are all the general offices for the Santa Fe Coast Lines, which include all lines west of Albuquerque, N. M. In the Los Angeles area the Santa Fe serves many hundreds of manufacturing plants and has two large freight yards, Ninth Street and Hobart, to handle the volume of originating and terminating traffic.

Moving south along the double track of the third district from the Union Depot, we are alongside the sometimes wet but usually muddy Los Angeles River. On the far bank we can see the main line of the Union Pacific, which will turn east a few miles north of us only to join the Santa Fe iron at Riverside Junction just 10 miles this side of San Bernardino. As we pass the Los Angeles roundhouse at Redondo Junction we can

see where the Harbor District branches off to the right. We swing left and cross the river, pass the newly enlarged Hobart yard, and are on double track as far as Bandini. It's single track with centralized traffic control for 2.2 miles, then we go back onto double track. This short single-track section is made necessary by several long narrow bridges across the San Gabriel and Rio Hondo river beds.

Soon the myriad, sky-pointing fingers of the oil derricks tell us we are in Santa Fe Springs. It's not far now to Fullerton, a quiet town in the heart of the orange belt. It is here that our double track ends and the San Diego line, the fourth district, drops away to our right. From Fullerton east through the Santa Ana River canyon as far as Riverside we again have C. T. C., and the density of the traffic through which we sail with seldom a pause shows why it was installed.

We are still in the orange country, and the packing houses cluster along the sidings and storage tracks by the little depots. There is Placentia, which in years gone by has had greater revenue than any other station on the Coast Lines, all from oranges; and Atwood, with more oil wells, but even these are among the orchards. The citrus industry in Southern California leans heavily upon the orange-painted refrigerator cars of the Santa Fe, and the Santa Fe leans back.

Into the Santa Ana River canyon now, and for the time being the groves of orange trees fade away. The Santa Ana Mountains close in and we thread quickly through on the north bank of the canyon. Corona and Arlington are pleasant interludes of slightly concentrated civilization in an otherwise all-rural panorama. Just east of Corona, at Porphry, the Elsinore branch cuts across the green hills to the south, but we'll be back here later.

Jack Whitmeyer, 3450 Russell St., Riverside, Calif.

The Rialto Avenue crossing near San Bernardino has a distinctive wigwag in that it is mounted on the block signal standard. This is on the single track main line of the second district.

Fletcher Swan.

A signal maintainer heads the southbound San Diegan into a passing track at San Clemente. This photo was taken before installation of centralized traffic control on this stretch.

Riverside is the first town of any size after leaving Fullerton and, as usual, we slow for the highway traffic. To our left are the Union Pacific tracks as they approach their depot, only a half block from the Santa Fe building. A half mile past the depot, at Riverside Junction, their tracks come in to share this Santa Fe iron for just 100 miles, leaving at Daggett, 8.4 miles east of Barstow.

To San Bernardino now, it's all double track except for a bridge west of Colton Tower. Here, at the tower, we cross the main line of the Southern Pacific. Over this crossing pass all the transcontinental trains to and from Los Angeles of the Southern Pacific and Union Pacific, plus two-thirds of the Santa Fe's Southern California traffic. Interchange tracks over which the SP and UP carry out their Pacific Fruit Express transfers are also located here. Colton Tower is the only mainline, heavy-duty tower on the Los Angeles Division that still is manually operated, having the old man-sized levers and long rods running to the switches and signals. The towerman is kept jumping to keep up with the steady stream of traffic on both lines plus the constant switching moves of the Southern Pacific in its Colton yard.

Moving up from Colton to San Bernardino, we see the huge precooler yard where all the refrigerator cars from the locals and fruit pickups of the second and third districts are iced and assembled into 100-car redballs to be skyrocketed across Cajon by the mighty yellow-and-blue Diesels. A sharp curve to the right and we find ourselves back in the San Bernardino passenger yard.

At the east end of San Bernardino yard one finds a small light-iron right of way cutting off to the southeast across town. This is the Redlands loop through Redlands, Mentone, Highland, East Highlands, Patton, and back to Highland Junction on the first district. It once was the blue-ribboned, No. 1 item of sale on the Los Angeles ticket-office shelf. For here ran the famous Kite Route trip. "Go one

way, return another. See sunny Southern California from the world-famous Kite Shape track." And you can bet that grandmother, mother, and all the kids did, too. East out of Los Angeles over the second district, around the loop, and back over the third district ran the excursion trains with liberal time allowed on the loop for picnics or just plain sight-seeing. But the day for excursions soon clouded over, and the Kite Route trips are a thing of the past. Now only a nightly fruit pickup ambles around the rusty loop, and the grandiose stations of Redlands, East Highlands, Patton, and the others play host to nothing more than waybills and a few antisocial spiders.

Sometime between nine and 11 every morning except Sunday, a short freight train is made up in San Bernardino passenger yards and heads down the third district with a little 1950 class engine on the point. This is No. 505, the San Jacinto local. It takes the branch at Highgrove, halfway between Riverside and Colton, and lurches eastward through the oranges, coughing furiously at the Box Springs grade, for it's climbing here just as steeply as it would over the Cajon. It is not long before the pull is over, however, for the grade isn't long, and the mesa over which the track rolls now is almost dead level as it heads straight southeast on a 10-mile tangent. The olive drab of army barracks closes in on the right and then on the left as well, for here are Camp Haan and March Field. Seemingly for miles the camp stretches along the track, and the number of cars along the sidings give a hint of where much of the revenue for the branch originates.

The only community of size along the branch is Perris, and from here to San Jacinto the track is southeast, east, northeast, and finally, from Hemet to San Jacinto itself, due north. These two small towns nestle close to the slope of Mt. San Jacinto, second highest peak in Southern California.

It's quite a jump now to San Diego and National City, the southern terminus of the fourth district, but with the printed word as our transportation we make the trip without a pause. Here is where the Santa Fe lines in California were born. In fact, the present depot at National City, some six miles south of San Diego, was the first division headquarters. It was built in 1882 and on January 1, 1883, was officially opened for business. It is at present the oldest depot still in use on the Los Angeles Division, although it bears little resemblance today to the proud structure of yesteryear. When the line was finished into San Bernardino the division offices were moved there and on April 23, 1887, the old building became merely the depot it is today. At this time the railroad was known as the California Southern and in 1892 was reorganized as the Southern California, which included several purchased or leased lines, all later bought and combined into the Santa Fe. National City is the site of the roundhouse and main freight yards for the Santa Fe in San Diego, but the passenger yard is located in front

A. H. Dunton, P. O. Box 302, Waverly, Ia.

The San Diegan↑ at San Diego in 1941. Halfway between here and Los Angeles the beautiful mission style station↓ at San Juan Capistrano blends well with the original mission which was founded about 1775 and which still stands about 300 feet to the left of the station, out of the photo. Pictured at San Bernardino early this year is the crack extra-fare Chief↘, while on an adjoining track is a local train behind a 4-4-2↘, now becoming very rare on AT&SF.

James L. Watson, 1016 W. 53rd St., Los Angeles 37, Calif.

Joe Lynch.

of the depot up in town. Let's go to the depot and climb into the cab of Motor 7 as she prepares to leave town northbound as No. 73, the *San Diegan*.

We head out of the yards, pass the wye just north of the depot, then swing around the north shore of the bay. At Old Town the double track ends and we see the familiar signaling system that informs us we are in C. T. C. territory again. The signals all show green and the Diesel shouts to the world that there's no stopping her. She slows at Elvira, however, to tackle the two per cent grade to Linda Vista. There's a stop at the summit to test the air, then she rolls on down the other side with a roar and a snap of her silver tail. The resort town of Del Mar at the bottom of the hill scarcely brings forth a brake application from the *Diegan*, and to our left now the blue Pacific stretches endlessly to the west. From Del Mar to near San Juan Capistrano the tracks follow the shore line closely with the white sands often just a few feet from the ties. All during the war trains on this stretch of track proceeded with lights carefully shielded from seacraft.

The 3130, with white flags flying, is waiting for us at Encinitas with a long drag of the tuscan red cars, and the 914 is right behind him, in for us at Ponto. We slide under the overpass at Carlsbad and soon see the track of the Escondido district swinging off to the hills at Escondido Junction. We are slowing now for the depot at Oceanside, our first revenue stop since leaving San Diego.

Taking the stopover privileges offered us by our paper conductor, we'll stop and look around at Oceanside before climbing back in the cab of No. 73. Oceanside proudly displays one of the newest of the depots on the division, placed in service in March, 1946. Just south of the depot is a small cement building housing the C. T. C. board governing train operations over the stretch from Old Town to El Toro.

The Santa Fe uses C. T. C. in a slightly different manner from other railroads. The machine is operated by a man who is in constant touch with the dispatcher in San Bernardino. The operator reports the trains passing certain points by checking the train graph on the desk before him. The dispatcher figures their times one against the other and tells the operator by telephone where to meet the trains and what to do with them. The man at the board still does all the actual throwing of the switches and signals but the dispatcher is the man in charge.

Oceanside also has limited engine facilities to take care of the locomotives running up the two branches leaving the main line just outside of town. They are the Escondido branch, which we noticed from the cab of No. 73, and the Fallbrook branch. We will see both in further detail later on.

Motor 7 is whistling off now, so we scramble aboard again and settle down for some more fast running. Not infrequent are slow boards limiting passenger trains to 95 miles an hour, so it can be seen that the *Diegans* are really intended to step along. Passing an enormous Marine Corps barracks we see the

Joe Lynch.

Fletcher Swan.

A third district local freight jogs across the Southern Pacific crossing at Colton Tower, westbound. No sooner has its caboose gone by than Extra 127 East rolls across the diamond with 74 cars of hotshot freight. Traffic runs on left-hand track here.

Fallbrook district leaving the main line just two miles north of the depot at Oceanside. The small beach communities fly by like so much salt-foam: San Onofre, San Clemente, and Doheny Park (or Serra, as the Santa Fe lists it).

Soon a searchlight signal looms ahead with a yellow indication. We are approaching San Juan Capistrano and turning inland, so we haven't the length of visibility we had before. A 10-pound air reduction slows us considerably from our 80-miles-an-hour pace and we ride up to the red signal at the east end of the siding under full control. Now it becomes apparent what was causing the red board. Extra 3744 East, with a string of troop sleepers, is heading in the other end of the passing track to clear us here. Someone must have slipped or else those troops are wanted somewhere in a hurry, for the streamliners are not delayed without a very good reason and a ready answer for the superintendent's office.

The delay is not long, however, for the 3744 swings her train in the clear with a flourish and soon we are rolling again, this time between the green hills back of the

sea. At El Toro the Fullerton operator takes over with his C. T. C. machine and almost simultaneously we shoot out across the Irvine ranch, passing No. 74, the southbound *San Diegan* waiting for us in the hole at Irvine. This is the second longest tangent on the division, slightly over 10 miles, and Motor 7 uses it to pick up the time lost at Capistrano.

Soon we begin to slow for Santa Ana, our only other stop before Los Angeles. From here to Fullerton, on the third district, again little time can be made because of highway crossings. The railroads of Southern California do not have the highway protection so prevalent in the eastern states. There are far fewer grade separations and less tendency toward underground or overhead right of way. This is probably due in part to the fact that the highways of the West developed after the coming of the railroads and then developed at a very fast rate.

In quick succession we thread through Santa Ana, Orange, Anaheim, and Fullerton. This is truly the heart of the Orange Empire. The volume of originating business in this area has made it necessary for the Santa Fe to put on a switching crew and engine, tying up at Santa Ana. They work all the packing houses in the surrounding towns during the day, assembling cars to be picked up by the through trains at night.

At Fullerton we swing wide around an easy curve to the left and take the crossover to the westward main of the third district. Although No. 73 does not stop at Fullerton, we'll swing off as it passes the depot with a wave to the crew for one swell ride.

This fourth district over which we have just ridden was probably one of the busiest stretches of single track in all America after Pearl Harbor. Many huge aircraft manufacturing plants are located in San Diego, and the Santa Fe was their only quick means of transportation to the north and the only high-capacity line to the east. The SP-controlled San Diego & Arizona Eastern line into San Diego from the Imperial Valley did not lend itself to the long trains and heavy traffic that immediately sprang up. The Santa Fe had spent considerable time and money before the war lengthening the curves and increasing siding capacities to better the high-speed passenger service to San Diego, so the line was in good shape when the demands of Mars brought undreamed-of business to San Diego.

Another line of the Los Angeles Division that found itself swamped soon after the start of the war was the Harbor district extending from Redondo Junction on the third district southwest through Inglewood, El Segundo, and Torrance into Wilmington. Entrance into Long Beach has recently been obtained by a joint track agreement with the Southern Pacific, which owns the line from Wilmington. This district, too, had its share of wartime plants and, coupled with the single-track traffic into and out of the harbor area, there were times when it was almost blocked solid. At El Segundo the Redondo district slides for five miles down to the beach towns of Manhattan, Hermosa, and Redondo. Both the Harbor and Redondo districts are freight only, though, like the Redlands district, they had their day in the passenger field.

Surely the most beautiful scenery to be found along the Los Angeles Division is on the Escondido district just south of Oceanside. The weed-grown track winds lazily back from the sea into some of the loveliest country ever traversed by rail. The name Escondido is the Spanish word for "hidden," and the Escondido valley is truly hidden. Avocados and citrus fruits of world renown are brought out by the meandering little train from the towns of Escondido and Vista, and the surrounding countryside forms a veritable sylvan paradise.

From the cab of the *San Diegan* we noticed Fallbrook Junction, where the Fallbrook district turns inland a few miles north of Oceanside, and while not so beautiful as its sister, the Escondido branch, it is far more interesting and historical. When the California Southern was originally constructed in 1882, the line ran north from National City and followed the present fourth district as far as where Fallbrook Junction is today. From here what is now the branch was then the main line, and it took a tortuous course into the coastal hills as far as Fallbrook station. There it followed the narrow bed of the creek through Temecula Canyon to the town of Temecula. Across the broad mead-

Barstow yard is capable of accommodating 2640 cars, but now that the wartime peak is past it is no longer groaning under capacity loads. Here at Barstow westbound freight is split up, some going northward over the Tehachapis to Fresno, Oakland, and San Francisco, the remainder going over the Los Angeles Division southward to San Bernardino, Los Angeles, and San Diego. Union Pacific freight for Southern California points also moves through this yard.

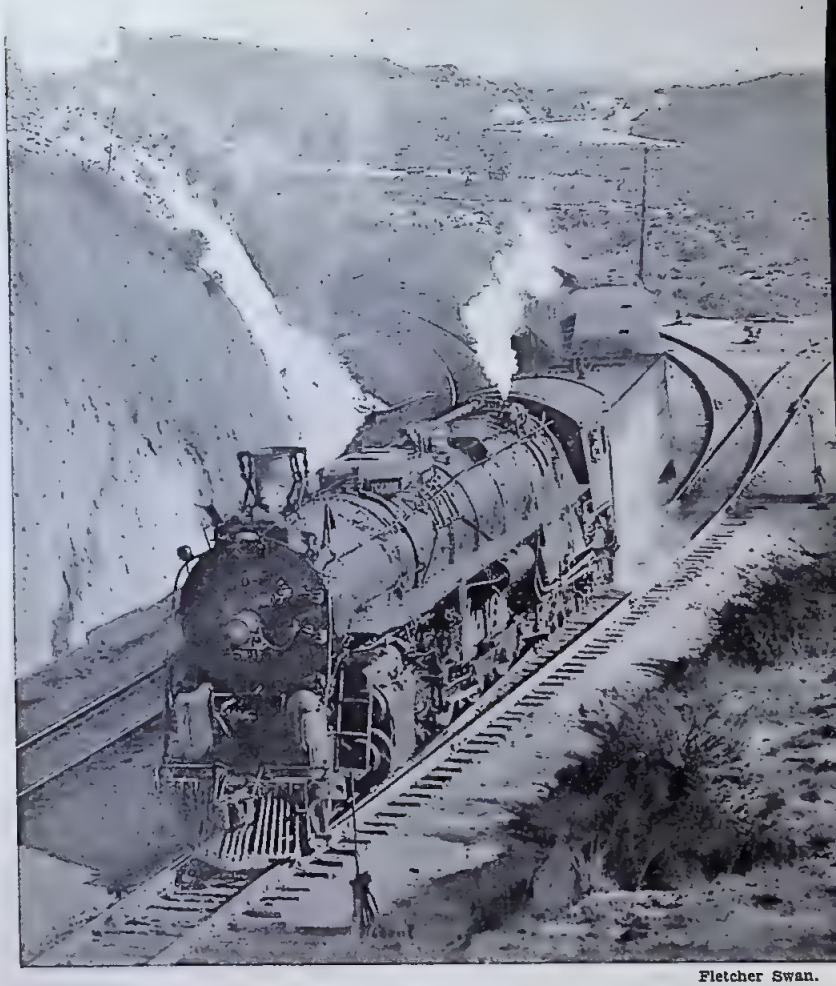
Fletcher Swan.

owland it stretched, around the shore of Lake Elsinore and through Railroad Canyon to Perris on the San Jacinto district. The track from Perris north to San Bernardino, the Fallbrook district, and the fourth district from Fallbrook Junction south are all that is left in operation of that original line — the main line of the first Santa Fe track in California.

Fallbrook supports and justifies the retention of the branch by its mainly agricultural traffic, but the rambling depot suggests that here again an attempt at passenger service flourished and died. The engines taking water at Fallbrook are serviced by an old locomotive tender sky-high on stilts which has been converted into a storage water tank. There is nothing to even hint that this could have at one time been a midway point on a pioneer transcontinental route.

Floods in the Temecula Canyon shortly after the line was opened proved that it was not as feasible a route as the builders had hoped. The line was badly washed out, rebuilt, and washed out again. Work was begun in 1886 on a line west from Highgrove to Atwood, then south to Orange and San Juan Capistrano, then known as East Riverside. The Placentia cutoff from Fullerton to Atwood, the present main line, was built in 1910. Soon after this roundabout route from San Bernardino to San Diego was finished in 1887, the altogether useless track from Fallbrook to Temecula was abandoned. There is very little today identifiable as old railroad line between these points. Even 50 feet from the present end of track on the Fallbrook branch it is only speculation as to where the pioneer railroaders ran their stadia and carried their rail. The eraser of time has well aided the railroad men in the cancelation of a costly mistake.

North of Temecula the remains of the line are quite easily seen, inasmuch as it was abandoned only in 1935, and it is not hard to imagine a squatty little Ten-Wheeler with four or five wooden passenger cars sailing along at a good clip across the green meadows in the beautiful valley. At Elsinore we again find the Santa Fe alive, but this is no part of the old main line. Instead it is the Elsinore branch down from the third district at Porphyry, and except for the few miles from Elsinore to Alberhill it is the most recent construction on the Los Angeles Division, having been opened for operation in 1927, about the same time the trackage from Elsinore to Perris was abandoned.



Fletcher Swan.

The first section of the California Limited↑ rounds the curve at the west end of Summit and starts the 25-mile descent to San Bernardino. On the distant hillside a freight train still waits for the Limited's second section to clear.

Much of the abandoned right of way bears a strong resemblance to the still-existing track of the Fallbrook and San Jacinto branches, for the old builders had their trademarks in the design of culverts and the slopes of embankments.

It was a still young country when the California Southern track gangs graded and spiked their way north from National City under the watchful guardian eye of the Santa Fe in the East, but California has grown to take one of the leading places among its 47 brothers. Similarly, from that twisting single-track route from National City to Barstow, the California Southern expanded into one of the major divisions of a major railroad. It crossed deserts and mountains and stretched along the sea; it built communities and commerce and then brought the people to expand them. It was not Southern California's first railroad, but it came to be the transportation machine on which the area depended most.

Many thousands of employees today handle the business of the Los Angeles Division (only Chicago employs more) and at their head is Superintendent A. B. Enderle. Operations are handled by the office of Chief Dispatcher Jack Snyder.

It is through their combined efforts that when, about 15 minutes before the eastbound Chief is due to arrive at Barstow and the Arizona Division dispatcher hears "No. 20's on time," just another routine run has been made, and another eastward transcontinental has completed the first lap on its journey, the Los Angeles Division.

Union Carbide & Carbon Corp.

H. W. Pontin, Rail Photo Service, 93 Massachusetts Ave., Boston 15, Mass.

PHOTO SECTION

Not all mountain railroading is in Colorado, nor is all Colorado railroading mountainous. The little city of Fort Collins (population, 5000) is bordered on the west by foothills; to the east the land is practically flat although nearly a mile above sea level. The Colorado & Southern runs down the middle of Mason Street← on a section of welded rail more than half a mile long. This day local between Denver and Cheyenne makes the 241-mile round trip in 7 hours 10 minutes.

Great Northern's newly streamlined straight electric locomotives↓ have the general appearance of Diesels, quite an improvement over the older locomotives↙ shown hauling a heavy eastbound freight through Tunnel 13 at Chumstick, Wash. Besides the two locomotives at the head end, three more are scattered throughout the train. The Cascadian→ has just left the west portal of eight-mile-long Cascade Tunnel and is nearing Scenic, Wash. This is the only daytime GN train making the 330-mile trip between Spokane and Seattle.

H. W. and W. J. Pontin.

A hotbox on a train can cause a lot of trouble even after the offending car has been set out on a siding. Here a Delaware & Hudson 4-6-6-4 struggles with its heavy train on a grade on the Susquehanna Division, just south of Bainbridge, N. Y., after setting out a hotbox.

Photo by Arthur F. Knauer, Fairview Ave., Colonia, N. J.

The Canadian Pacific uses Boston & Maine track between Wells River and White River Junction, Vt. Below a CP Newport-White River Junction freight leaves the siding at Bradford after meeting a B&M local passenger train.

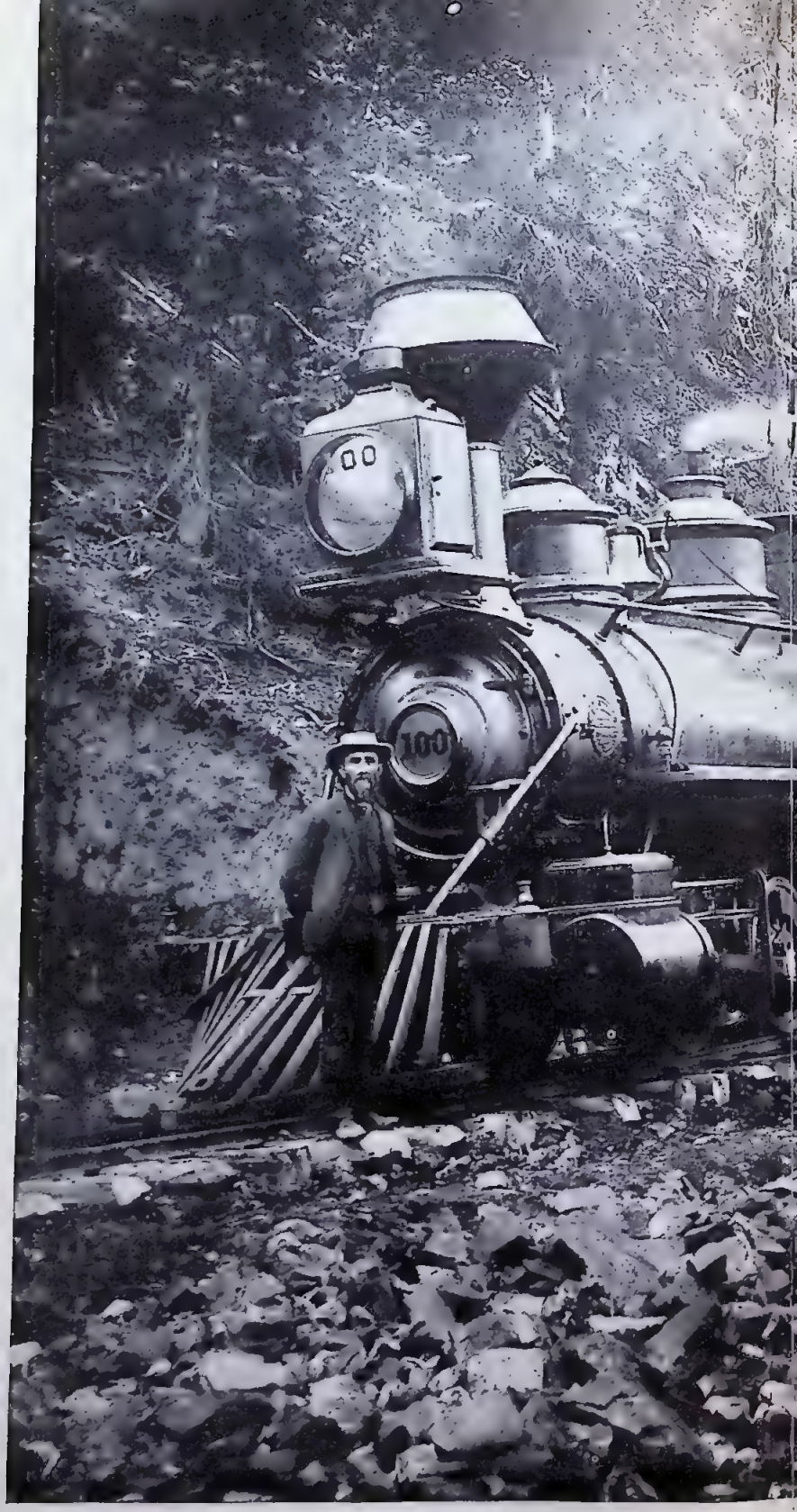
Philip R. Hastings, 22 University Rd., Burlington, Vt.

H. R. Griffiths, Box 1162, Boise, Ida.

Chugging along at five miles per hour with its four cars, sans caboose, Nezperce & Idaho No. 9 is one hour east of Craigmont, Ida., its western terminal. This line, 13.8 miles long, at present is not operating due to the condition of its track and trestles. It once went to Lewiston, 75 miles.

Using Union Pacific and Northern Pacific power, the Camas Prairie Railroad operates 258 miles of line in Washington and Idaho. It is controlled jointly by UP and NP, hence has a mixture of locomotives. This southbound 45-car freight train is negotiating the heavy grade at Lapwai, Ida.

H. R. Griffiths.



One characteristic of Otto Mears' narrow gauge railroads in Colorado was their twisting,
right of way. One curve on his Silverton Railroad was said to be "so sharp you'd have to p

L. C. McClure.

undulating
ut a hinge

on a jackass to get him around it." This scene on the Silverton Railroad was photographed just after completion near Red Mountain, for many years the northern terminus. Otto Mears is second from left.

Fairchild Aerial Surveys, Inc.

North Station, Boston, was built on the site of three former obsolete stations and over a period of time has become one of the country's most modern railroad terminals. All trains entering the station, which is occupied only by the Boston & Maine, bear even numbers and all outgoing trains bear odd, regardless of their direction after leaving city. Tracks in front of station are transit lines from downtown ↗ to Sullivan Square and ↖ to Lechmere Square. Boston Garden occupies station's top floor.

The Chestnut Ridge Railway, a subsidiary of the New Jersey Zinc Company, operates 11 miles between Palmerton and Kunkletown, Pa., and two miles between Palmerton and Lehigh Gap. It is a Class 2 railroad connecting with the Central Railroad of Pennsylvania at Palmerton and the Lehigh & New England at Palmerton East. Train is eastbound at Palmerton.

R. P. Morris, 214 Gelston Ave., Brooklyn 9, N. Y.

Rochester's Railroads

Five lines serve New York's Flower City, but passenger traffic is confined mostly to the New York Central's "great steel fleet"

ARTICLE AND PHOTOGRAPHS BY A. M. RUNG JR.

The city of Rochester in upstate New York is a busy community with humming factories and beautiful homes. It is essentially a man's town. The many diverse, highly technical industries attract keen, energetic men to run them; and salesmen, representatives, and officials of these firms continually pour into and out of the city, bound for all parts of the country and all parts of the world.

The great bulk of Rochester's passenger traffic is handled by the New York Central: westward to Buffalo, Cleveland, Toledo, Detroit, Chicago; eastward to Syracuse, Albany, Boston, New York. The Baltimore & Ohio operates two coach trains daily to Pittsburgh via its Buffalo, Rochester & Pittsburgh, and the Lehigh Valley angles southeastward to reach Allentown, Bethlehem, and Philadelphia, with connections for Baltimore and Washington. A solitary Pennsylvania Railroad sleeper from Washington, Baltimore, and Harrisburg slips into Rochester via the Central from Canandaigua, while the Erie thrusts a tentacle northward into Rochester to gain a freight foothold. Freight service is similarly provided by the Pennsylvania.

Perched high on the straight bank of the roaring Genesee River, fronting on the Court Street bridge, is the Lehigh Valley's smoky-yellow brick station where four trains arrive and depart daily. Next to the station, on the bridge, are the company's district traffic offices. The swift-flowing Genesee speeds on its noisy way directly under the office floor of good-natured Henry Hoffman, district passenger agent. "Yes, it's pretty cool here in the summer," grins Henry, "but during the winter it's likely to get too chilly." There is a brisk and never-ending struggle for position among the upstate cities for the dubious honor of being the coldest in winter. Rochester usually holds her own.

Rochester is a branch line operation for the Lehigh Valley, and connecting service to the main line 13 miles south at Rochester Junction is handled by two gas-electrics with passenger trailers. The morning train connects with the eastbound *Black Diamond*, while the night train tows the Rochester-Philadelphia sleeper to the junction and tacks it onto the rear of the *Star*. A similar performance, in reverse, is repeated when the gas car takes the returning sleeper off the rear of the westbound *Star*.

About 8:30 every evening the first few passengers for the night train filter into the station. The coach passengers, boys and girls in their late teens, bound for towns on the way to Allentown — sometimes to Philadelphia or Washington — engage in eager, cheerful last words with their families, but always in a self-consciously hushed tone, for the worn walls of the station seem to reverberate and amplify each word. Then the Pullman passengers begin to arrive; several traveling salesmen engage in dispirited conversation from their seats on the wooden benches; a young woman walks through the waiting room carrying her small baby, intent on getting aboard the sleeper and away from the drafts of the station. Conductor Bob Cotton, a lean, well-preserved veteran of 38 years' service, takes the Pullman passengers' rail and space tickets as they board the car, later to turn them over to the *Star's* conductor at the junction.

At 9:10 the hybrid motor-express-mail-baggage unit, pulling the sleeping car and lightweight coach, gets under way, motor roaring like a heavily laden giant airplane trying to get off the runway. Slowly gaining speed, it clatters and sways along the banks of the Genesee and out into the wide, flat country to the south.

Some 40 minutes later it sputters to a halt in the highly fragrant darkness of Rochester Junction, whose platform lights are no match for the all-encompassing darkness. While mail, baggage, and express are being unloaded onto

Carl Stolberg, 801 Plymouth Ave. S, Rochester 8, N. Y.

High above the 90-foot Upper Falls of the Genesee in downtown Rochester whiz trains of New York Central's great steel fleet. In the early days of the railroad all through trains stopped at this point to allow passengers to view the falls. At that time a park occupied one of the lower banks, but today it is filled with scrap metal.

waiting hand trucks, a train is heard in the distance. Presently, with the sharp staccato exhaust of a passenger train at full speed, a 110-car Lehigh Valley freight hurtles through the junction at 70 miles an hour behind a powerful 4-8-4. Its roar has no sooner faded into the night than a soft whistle is heard from the opposite direction; a headlight appears, and the *Star* slowly and with almost unnatural quiet drifts to a stop.

Already-filled head-end cars are now jammed to overflowing with the addition of the Rochester express. The conductor watches the apparently endless loading procedure and is obviously concerned with holding to his schedule. Finally the loading is completed, and the *Star* slowly pulls beyond the home signal and stops. This is what the gas car has been waiting for; having already run around and coupled itself behind the Pullman, it pushes the sleeper against the rear of the *Star*. The coupling is made, markers are put on, and the *Star* picks up speed and swiftly disappears. The semaphore arm drops to horizontal, its red lamp glowing brightly, and quiet settles once again.

Across the Genesee River from the LV tracks in Rochester is the Erie freight yard. Into this

The NYC main line runs through Goodman Street Yard. Signals on bridge identify the two through tracks. Beyond the signal bridge are tracks of the main classification yard. Switching engine is in the clear, waiting for a fast express train approaching on the main line.

Carl Stolberg

A. M. Rung, 3438 N. 20th St., Philadelphia 40, Pa.

The Lehigh Valley's Rochester terminal is unique in that it is entirely over water↑ on the bank of the Genesee River. Tracks parallel river and old canal (behind concrete wall under highway) which is now used by subway trains. Cars↘ for night train wait at station.

A. M. Rung.

Diesel switcher 122↑ takes the Valley's motor combine to the yards and pushes it onto the turntable. New York State Canal warehouse↓ forms an incongruous background as unit is turned for trip to Rochester Junction.

A. M. Rung.

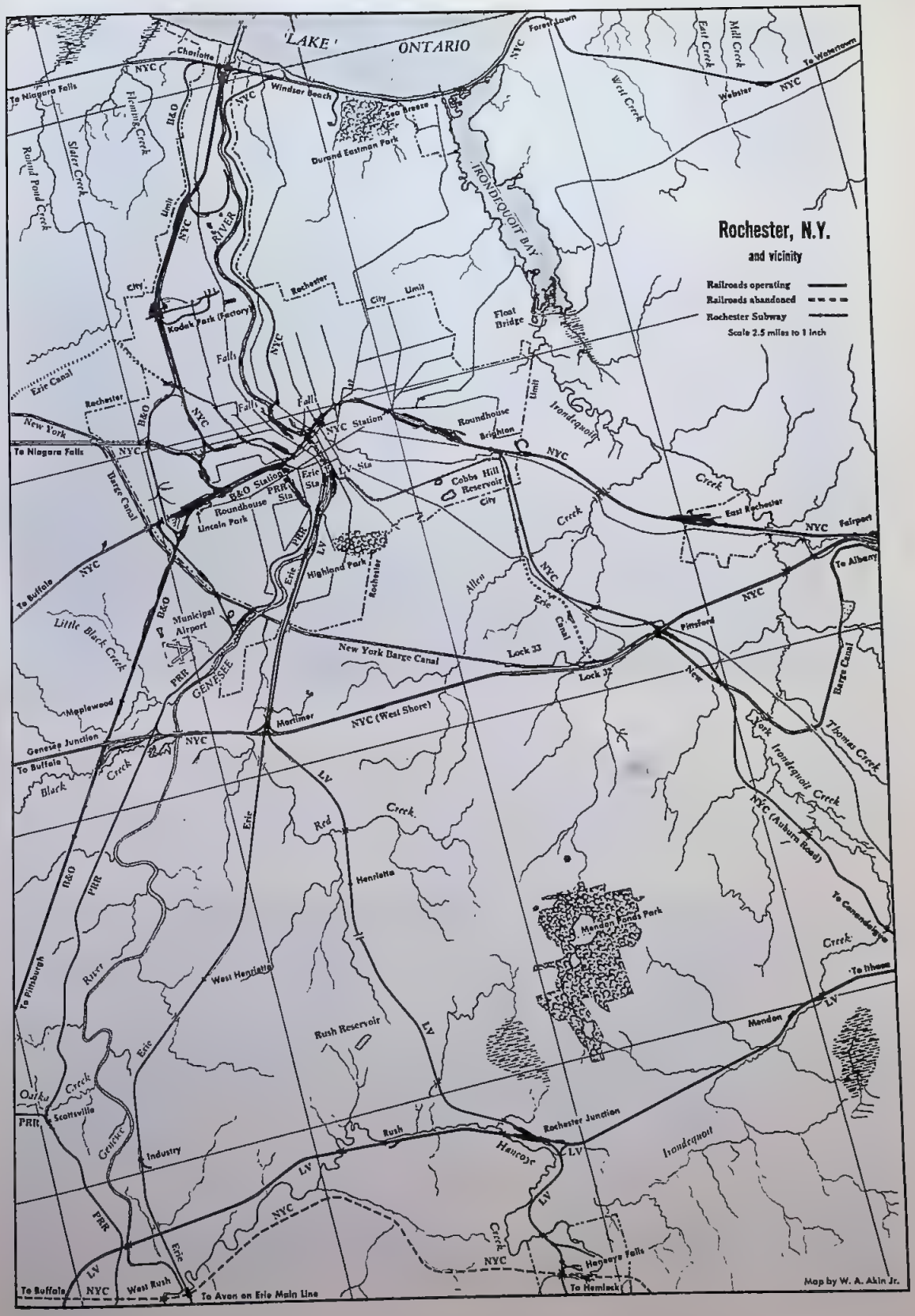
rather small yard roll freight cars from Jersey City in the east, and Cleveland, Chicago, and Cincinnati in the west, by way of a line which leaves the Buffalo branch at Avon, 18½ miles to the south. At nine each evening the local freight lies in front of the rambling old freight house, caboose markers glowing dully, its light Consolidation engine breathing quietly, waiting for train time. The brilliant lights of downtown Rochester illuminate the sky in the background.

Diagonally across the city, to the west, are Pennsylvania's solid, businesslike freight station and Baltimore & Ohio's passenger station, facing each other across West Main Street. The Pennsylvania enjoys a brisk freight business in Rochester, with four trains in and out daily. A fair portion of this business is cotton cloth from southern mills on the Chesapeake & Ohio and Southern, consigned to the famous "Rochester-tailored" clothing factories of the "Flower City."

The name "Flower City" has an interesting derivation. Back in the early days, because of its flour mills, the town acquired the nickname "Flour City." As time went on, other industries overshadowed the milling business, which practically disappeared. In the meantime the city's many parks and lawns became gardens of lilacs, roses, and other flowers which attracted visitors from far and wide. The spelling of the sobriquet thus evolved into "Flower City."

The neat Baltimore & Ohio station with its carefully tended grass plots witnesses the arrival and departure of two Pittsburgh locals daily and a weekday commuter train to and from Perry at the end of a short branch off the Pittsburgh line 58 miles southwest. Mail and express are the sustaining features of the Pittsburgh runs, and the two well-kept coaches of these trains carry, for the most part, passengers destined to local stops along the way. Two trim P-19 Pacifics handle the service to the Golden Triangle City.

Inside the station is found the traditional homelike, cozy atmosphere of most B&O stations. Warm during Rochester's bitter winters, it is religiously cleaned from tiled floor to ceiling, and the silver-haired grandmother contentedly knitting there at one end of the bench seems right in keeping with the station's personality. A cheerful young woman en route to a small town down the line buys a ticket and a half for herself and her young, healthy-looking son from the friendly night agent, Harold Berry. In charge of perishables for the old BR&P until 1932, Berry joined forces with the


Rochester, N.Y.
and vicinity
Railroads operating
Railroads abandoned
Rochester Subway
Scale 2.5 miles to 1 inch
LAKE ONTARIO
IRONDEQUOIT BAY
Charlotte
Windsor Beach
Sea Breeze
Durand Eastman Park
Forest Lawn
Webster
To Watertown
East Creek
Mill Creek
West Creek
To Niagara Falls
Round Pond Creek
Slater Creek
Fleming Creek
Kodak Park (Factory)
Rochester
City Limit
Float Bridge
Erie Canal
New York
Roundhouse
Brighton
Irondequoit
Cobbs Hill Reservoir
East Rochester
Fairport
To Albany
Barge Canal
Lincoln Park
Highland Park
Municipal Airport
Little Black Creek
New York Barge Canal
Lock 33
Lock 32
Pittsford
Maplewood
Genesee Junction
To Buffalo
Mortimer
NYC (West Shore)
Thomas Creek
Irondequoit Creek
NYC (Auburn Road)
Red Creek
Henrietta
Mendon Ponds Park
To Canandaigua
To Ithaca
Mendon
West Henrietta
Rush Reservoir
To Pittsburgh
Oatka Creek
Scottsville
Industry
Rush
Rochester Junction
Hancoye
Hancoye Falls
To Hemlock
West Rush
To Avon on Erie Main Line
Map by W. A. Akin Jr.

A. M. Rung.

Head-end business was light the day this photograph of train 43, NYC's westbound South Shore Express↑, was taken. In contrast to the one baggage car shown, the Express sometimes carries as many as eight, and 10 minutes of the train's schedule are set aside for the loading and unloading of baggage, express, and mail at Rochester. The South Shore Express is a comparatively slow train, leaving New York at 1:45 in the morning and arriving at Niagara Falls, 461 miles, at 3:41 in the afternoon. Much time is consumed in the Schenectady-Utica district, where 10 stops are made in 78 miles. The Erie Railroad's sole reason for existence in Rochester is freight, which it handles in a small yard↓ on the west bank of the Genesee. From here the local freight train runs 18½ miles southward to connect with the Buffalo branch at Avon, N. Y.

A. M. Rung.

B&O when that road bought the line. Other former BR&P employees are now to be found on all the railroads serving Rochester, in many different capacities.

Throughout the midnight-to-dawn hours the New York Central's magnificent "great steel fleet" of east-west trains pounds through Rochester — a fleet of familiar and impressive names such as *Commodore Vanderbilt, Paul Revere, Twentieth Century, Wolverine, Detroiter, Southwestern Limited,* and a whole host of other crack speedsters which have placed the Central at the top of the list of outstanding passenger carriers. Giant freights also roar past the quiet station, cars rocking and swaying behind the surging power of speeding Mohawk locomotives. On the heels of a preceding freight, a three-unit black and silver Diesel slows its 125 cars to a halt before the piercing red signal light at the end of the platform. The light turns to amber, then green, and the Diesel growls, soon filling the night with angry roars as it quickly picks up speed and vanishes around the long sweeping curve to the east.

The first faint traces of the breaking dawn are visible as the *Niagara* gets under way for her final 85-minute sprint to Buffalo, signifying the windup of night fleet activity. The *Fast Mail* follows almost an hour later. The eastbound *Water Level Limited* slipping away to New York at 6:23 puts an end to eastbound activities for almost four hours. Rochester's own train, the *Seneca,* with modern coaches and sleepers from New York, rolls to a smooth halt at 7:39. The business day officially begins when the *Seneca* arrives and unloads businessmen, bankers, insurance agents, and department store buyers who have done their little bit in "the City" and are coming back to report just what's new or what has been accomplished. Representatives and salesmen of the many large plants and factories in Rochester are "coming home" for instruction, refresher courses, or good old-fashioned sales pep talks. And there are quite a number of other agents and contract hunters arriving to solicit orders from these same firms.

The *Missourian* from St. Louis rolls across the Genesee River bridge and into the station at 10:06, a ponderous Niagara (4-8-4) towing several new stainless steel luxury coaches and four Pullmans, including a lightweight bedroom-roomette car. The *Iroquois* from Chicago glides in at 11:18, while from the east at 11:23 comes No. 43, the *South Shore Express,* consisting of a Boston-Buffalo sleeper, a few coaches, and about eight head-end cars jammed to the rafters with mail and express. The *South Shore* is allotted 10 minutes to service the head-end volume, and the mail and express men are

The New York Central's Advance Empire State Express↘, which originates at Buffalo, leaves Rochester at 1:10 in the afternoon with a heavy load of Rochesterians, thus relieving the strain on the stainless steel Empire State Express↙ which leaves two hours later. Both trains are popular with New York-bound passengers, the one arriving in Grand Central at 8:40 and the other at 10:15. Age of the streamlined train, which originates in Cleveland, is easily reckoned, for it was while she lay in Rochester on her maiden trip that news of the Pearl Harbor attack was relayed to the passengers by the stationmaster. It's easy to relax in the Empire's comfortable reserved seats as the train speeds southward along the east bank of the broad Hudson River. Twilight settles over the water as the retiring sun silhouettes the west palisades.

Both photos by A. M. Rung.

pushed to make it. While 43 is in the station, the conductor, an energetic mustached chap and apparently a Rochesterian, grabs a railroad phone on the platform and speaks to a station clerk: "Hey, Fred, call her and tell her I'll be in on 50, home about 3:30." Having done his part toward insuring a successful dinner upon his return, he climbs aboard and very shortly the big Niagara is effortlessly walking her 18 cars out of the station.

The big event of the day, however, is the departure of the eastbound *Empire State Express* at 3:10 in the afternoon. No trip to New York (known locally as "the City") is considered successful by the people of Rochester unless the going trip, at least, is made on the stainless steel Budd-built *Empire*. This is apparently true throughout the territory served by the train; its name seems to convey a magic touch. Everybody tries to get on the *Empire* — good-looking young women week-ending in New York, businessmen who like its economy and schedule (7 hours 5 minutes to New York), college students, office workers, and the plain, ordinary traveling people whose identity just blends with the crowd.

Meet Joe Du Plessis↓, train announcer and gateman whose cheery voice and pleasant smile won membership for him in the Rochesterians, a civic booster club. Joe's amusing train announcements echo in the Central's spacious waiting room↘ and gather travelers into lines at the train gates, where Joe punches their tickets.

Overnight service to Boston is provided by the *Boston Express* at 6:07 p.m., carrying a sleeper, a diner, modern coaches (as all Central coaches seem to be), and the heavy head-end business that is also standard on the Water Level Route.

At 7:30 each evening a sleeping car departs to Baltimore and Washington. Leaving via the old Auburn Road and train 18 (a Syracuse local humorously known to Rochester businessmen as the "Brighton Bullet" due to its leisurely pace and the fact that it makes the suburban stop of Brighton, three miles away), the car is accompanied to Canandaigua by a deadhead sleeper that will open there for occupancy and continue to Syracuse, to be attached to Rochester's *Seneca* for the trip to New York.

The head-end cars of the "Bullet" are stuffed with shipments for Canandaigua, Elmira, Williamsport, Harrisburg, Baltimore, and Washington, where they will be worked by expressmen. The contents of a dozen hand trucks loaded high with Rochester's products go into these cars every night. Some of the many articles and trade names on the cartons, bales, and boxes are: Photostat and Haloid sensitized materials, Eastman Kodak films and papers, Graflex cameras, Hickok belts and suspenders, Michael Stern Rochester-tailored clothes, Superba cravats, General Motors parts, Taylor instruments, and Lake Ontario apples, to name only a few. Quite an imposing list, though abbreviated; and

Both photos by A. M. Rung.

one which shows why Rochester is also unofficially known as the "Photo City."

At Canandaigua nearly half an hour is allowed for a quick dinner at the spacious Canandaigua Hotel, an off-the-beaten-path stopping place that harks back to the 19th century days when Rochester and Canandaigua vied for position on the Central's main line.

Back again at Rochester, the forerunners of the great night fleet begin to arrive and depart for the west, swinging into the station around the graceful curve to the east, pulling away beneath the huge shadowy arms of signal bridges with their large, glaring red and green eyes. Looming above the station scene and downtown Rochester is a floodlighted building with prominent letters that spell KODAK in bright neon red, a pleasant contrast against a night sky. The *North Shore, Advance Knickerbocker,* and *Advance Commodore* sweep their brightly lighted Pullmans westward as station activity takes a jump. Now the businessmen and businesswomen begin to collect at the entrance to the underground tunnels, to present their Pullman tickets for space on the City-bound *Seneca.* The high arched ceiling of the yellow brick station echoes to the pleasant sing-song chant of "Old Joe" Du Plessis, the station gateman.

Du Plessis is an outstanding good-will man for the New York Central, which he joined in 1918 as a train announcer, his first job. Today, some 29 years later, Joe is still at his job, and his friends are legion. Joe is so highly and fondly regarded by Rochester travelers that he was nominated to membership in the Rochesterians, a business and professional men's civic booster organization, in 1945. He stands at the entrance to the tunnels under the station tracks and punches the tickets of all passengers going through the gate, adding a little personal touch with a "Have a nice trip, ma'am," or a brisk, cheery "Yes, sir." After listening to Joe's amusing train announcements the passengers are in a pleasant frame of mind, and after passing the ritual of ticket inspection they usually get aboard the train in high spirits. Handling the many queries and requests with speed, patience, and good humor, Joe moves the crowds out onto the platform in good time.

Two young girls, quite flushed and excited, try to hurry past. "Where are you going, ladies?" asks Joe. "We're meeting somebody — you see, he doesn't know we'll be here," one explains breathlessly. "Well, I'm sorry, lady, but I can't let you through without a ticket." "Oh, but it's my *husband!*" wails the girl. "Well, that's different, then," says Joe, stepping to one side. "Track 10."

"This is a good place to study human nature," beams Joe. "I like my work here, and I try to be pleasant and help the passengers the best I can. Some are cross and some are pleasant, but we try to be nice to them all."

And the chances are excellent that the many thousands who have passed through Rochester on the New York Central will always remember the unsung good-will men like Joe who are making and keeping a host of good friends for the nation's railroads.

At 7:30 every evening the "Brighton Bullet" (right↓) pulls out for Canandaigua with a Washington sleeper at the rear, while the Seneca↙ waits for its City-bound Pullman passengers. The westbound North Shore Limited↘ rolls to a halt in front of the signal lights at the end of the platform while Kodak tower lights the sky.

Both photos by A. M. Rung.

New Zealand Railways

3500 miles of 3′-6″ gauge line twist and climb over mountainous islands far out in the South Pacific Ocean

Six thousand miles southwest of San Francisco and 1200 miles southeast of Australia lie two large islands, together more than a thousand miles from north to south and shaped somewhat like a boot cut in two just above the ankle by a narrow strait. This is the British dominion of New Zealand, about as long as California and with a land area of slightly more than 100,000 square miles. The population is around 1.6 million, 75,000 native Maoris and the rest predominantly decendants of British immigrants.

Extending almost the full length of the islands and branching off at strategic points to serve the interior are the 3′-6″ gauge lines of the New Zealand Government Railways, some of the toughest railroad in the world both from a constructional and operational standpoint. Twenty-six per cent of all the 3500 miles of track is curved, with a maximum curvature of 15° 47′ and the longest tangent only 7½ miles. Six per cent of all trackage is laid on curves sharper than 8° 40′, and 12 per cent is sharper than 5° 47′. Steep grades abound. On the busiest main line, between Auckland and Wellington on North Island, only seven per cent is on grades of less than 0.5 per cent. Sixty per cent of the line is on grades of 0.5 to 1 per cent, 27 per cent is on grades of 1 to 2 per cent, and six per cent is steeper than 2 per cent. One three-mile section of the Wellington-Masterton route averages 6.6 per cent — so steep that special "Fell" locomotives must be used in the ascent.

The Fell system is somewhat similar to a cog road except that it operates by adhesion to a smooth center rail instead of by a rack and pinion drive. The double-faced center rail is laid horizontally and a pair of horizontal drive wheels operating from inside cylinders grip this center rail to provide an additional 10,394 pounds tractive effort, nearly doubling the pull of the 0-4-2 tank locomotives which are used on the grade.

Railroad construction on the mountainous islands has involved major engineering problems right from the beginning. The first 6½ miles of road, between Christchurch and its seaport, Lyttleton, included a tunnel 1.62 miles in length which alone cost more than $¾ million. This line, begun in 1860, was not completed until 1867. In the meantime, other rail-

Hugh Bennett, Auckland, New Zealand.

A freight train← approaches Auckland, pulled by a streamlined Mountain (4-8-2) locomotive equipped with roller bearings. This modern locomotive has proved highly successful for both freight and passenger service. Sixteen-car excursion train↓ arrives at Auckland, second largest city on North Island. Overnight passenger service is provided between this city and Wellington. In spite of the narrow gauge, 3½ feet, the New Zealand Government Railways are well maintained, efficient, and generally quite up to date. Block signals and centralized traffic control protect train movements on heavily traveled lines. As in most British possessions, left-hand running is prevalent but American tee rails are standard.

Hugh Bennett.

TRAINS STAFF

Based on material from Carl B. Hewett, J. D. Mahoney, and the New Zealand Railways.

roads had been started. Scattered throughout the provinces, their gauges varied. The Christchurch-Lyttleton line was 5'-3"; others were 4'-8½". The Railways Act of 1870 fixed the gauge at 3'-6", primarily because of construction costs. Existing lines were changed to conform to this standard. Even with the narrow gauge, however, construction has required an abundance of engineering skill.

Otira Tunnel on the Christchurch-Greymouth line, connecting the east and west coasts of South Island, is the longest railway tunnel in the British Empire. This 5.31 miles of perfectly straight bore under the precipitous Southern Alps was 15 years in building. It rises on a 3 per cent grade from an elevation of 1586 feet at the west portal to 2435 feet at the east portal. It was electrified and opened to traffic in 1923.

The largest trestle in the Southern Hemisphere, and one of the largest in the world, is on the Napier-Gisborne line on North Island. This is the Mohaka Viaduct, 315 feet high and 911 feet long. It crosses the Mohaka River gorge and was opened to traffic in 1937. Because of prevailing high winds, the trestle is equipped with wooden windbreaks, resembling high picket fences, as a protection against trains being blown off the track.

New railroad construction in New Zealand is still under way. One of the latest lines to be completed (1945), between Parnassus and Wharanui, completes the route between Invercargill at the southern end of South Island and Picton at the northern end, and makes possible train ferry connections with the North Island system.

But although new lines remain to be constructed before the New Zealand Government Railways will be considered complete, many of the largest construction jobs in recent years have been relocations, grade easements, or other improvements. The largest such project, completed shortly before the outbreak of war, involved completely rebuilding all terminal facilities and mainline approaches at the capital city of Wellington (North Island). Railroading through the mountains in this area used to be a strenuous task. Mainline trains pulling out of the cramped yards, which were wedged between mountains and the harbor, started right off into a tortuous section of sharp reverse curves through five smoke-filled tunnels and climbed 518 feet in the first five miles. The grade touched 4 per cent.

The new layout required filling in 68 acres of harbor, relaying and relocating all yard tracks, and bringing the main line into the city by 8½ miles of new route through the mountains. This called for two new double-track tunnels, 2.67 and 0.67 miles long. The longer tunnel is laid with continuous welded 100-pound rail. All of the new track is on less than 1 per cent grade, which is practically level in New Zealand.

The old main line was electrified and given over to suburban passenger service with multiple unit trains. As a part of the same project the new Wellington station was built. This handsome building,

Hugh Bennett collection.

The modern station at Auckland overlooks the waterfront with beautiful Waitemata Harbor in the background. Train sheds are on the right, yards on the left. In the harbor are yachts and motor boats owned by wealthy citizens.

Hugh Bennett.

Auckland yards as seen from station roof with Waitemata Harbor in background. Note floodlighting facilities. These pictures are in trainride sequence.

J. D. Mahoney.

Top: A limited comes into Auckland yards. Bottom: Auckland outskirts.

by far the largest in New Zealand, also houses the general offices of the NZR. It is six stories high, and has five acres of floor space, more than 250 rooms and offices, and four platforms with a total frontage of almost a mile. The station alone cost $1,376,400, quite an investment compared with the amount appropriated by Sir Julius Vogel's Railway Act in 1870 for the building of 600 miles of railroad in the dominion.

Julius Vogel, shaggy-browed, abundantly bearded and with his hair parted in the middle, might be termed the godfather of the New Zealand Railways. An erstwhile English newspaperman, he went to New Zealand in the wake of the gold rush in 1861, became prominent in politics and in 1870 introduced his public works scheme which included the building of railways to aid immigration.

At that time seven railroads were operating in the nine provinces over 65 miles of track. Even had these railroads connected with each other, which they did not, it would have been impossible to travel the 65 miles without several changes of cars, for three different gauges were in use.

Vogel's bill was revolutionary in two respects. Not only did it call for the pledging of the national credit to secure more favorable rates on a loan of £10 million (then about $50 million), something which had not been done before, but it included a plan by which the railroads would not only pay for themselves but would show a profit which could be used for the further extension of the lines. The plan was simple: The government would set aside land reserves along the projected routes of the railroads. As the rails pushed forward the land values would rise; as they rose the land would be sold. The money thus collected would repay the loan and furnish additional capital.

But politics were politics in those days as well as now, and while the first part of Vogel's plan was quickly adopted to raise money — £4 million instead of the proposed £10 million, then another £10 million at a later date — the nine provinces forced the dominion government to sell the land in advance of the railroads, which were then under provincial control. In so doing the provinces sealed their own doom. Six years later they were abolished and the railroads

J. D. Mahoney, Box 480, Auckland, New Zealand.

The Taneatua Express nears the 1125-foot Parnell Tunnel about two miles outside of Auckland. The isthmus south of Auckland between the harbors of Waitemata and Manukau is a large residential area served by New Zealand Railways.

came under dominion ownership.

Government ownership has resulted in some delays in construction as policies have been changed coincident with elections, but it is doubtful that private ownership could have accomplished as much toward uniting the dominion. Capital was exceedingly scarce in the early days; indeed, that is why Vogel hatched his plan. The adoption of one gauge as standard was, of course, a big step forward. The fact that the government is more interested in developing the country than in showing a profit on railroad operations as such has been a big factor in the extension of the network of rails.

Since 1926, when private motor transport in the more profitable section of the country threatened to deal a serious blow to the government's carefully designed system of railway freight charges, the Government Railways have controlled a network of road services operating in various parts of the dominion. The manufacture and upkeep of motor vehicles, the operation of motor services, and the planning of tourist trips by car and bus are now part of the NZR.

Not all railroads in New Zealand are government owned, however. Miles of private railway lines were built by lumber and coal companies to further their exploitation of forests and mines, and while many of these have been abandoned, others are still in existence. In effect, they amount to long industrial sidings branching from the NZR, using their own motive power just as many industries in the United States use their own switchers inside the limits of their plants. Some of these private railroads at one time carried passengers and were actually common carriers, but today most remaining lines offer freight service only.

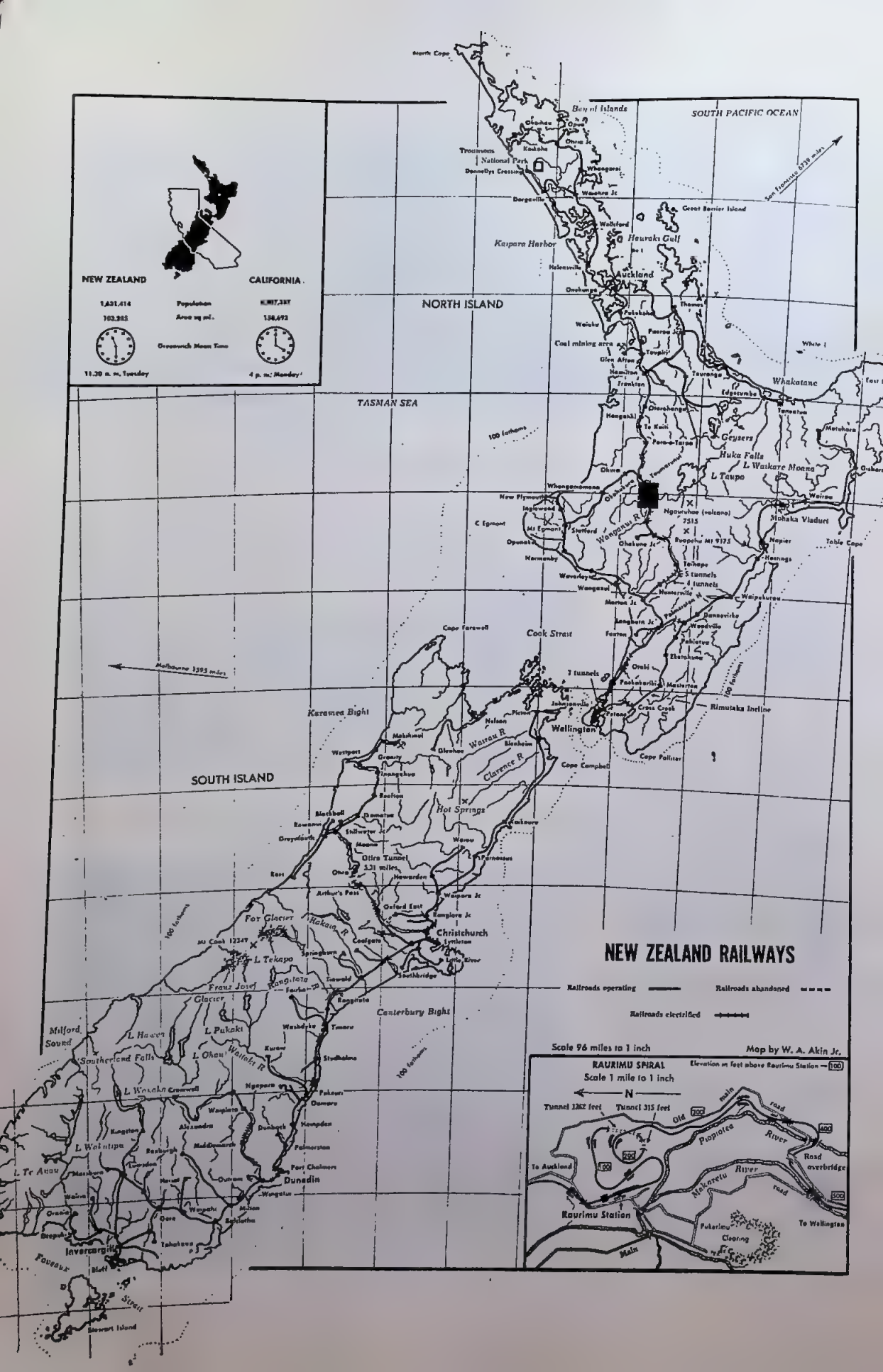
Freight traffic on the New Zealand Railways is predominantly agrarian. Millions of sheep and cattle are moved annually, requiring a large number of stock cars; dairy products and dressed meat account for an imposing array of refrigerator cars. These cars, for the most part, are 30-footers with two four-wheel trucks. More numerous are the 16-foot four-wheel all-purpose cars, open to the sky and equipped with tarpaulins for protection against the weather.

Coal, timber, wheat and other grains, and various mineral products all flow to the factories and ports at oceanside. In the reverse direction roll trains of clothing and textiles, machinery, sugar, tea, alcoholic liquors, tobacco, paper and stationery, oils, chemicals and other commodities from incoming ships.

Passenger service is frequent, considering the small population. Through service between Auckland

A tank locomotive with a suburban train emerges from Parnell Tunnel near Auckland. This is one of the 32 tunnels on the 425½ mile main line to Wellington.

W. W. Stewart, Auckland, New Zealand.


NEW ZEALAND RAILWAYS
Railroads operating
Railroads abandoned
Railroads electrified
Scale 96 miles to 1 inch
Map by W. A. Akin Jr.
RAURIMU SPIRAL
Scale 1 mile to 1 inch
Elevation in feet above Raurimu Station
N
Tunnel 1262 feet
Tunnel 315 feet
Old main road
Piopiotea River
Makaretu River
Road overbridge
To Auckland
To Wellington
Raurimu Station
Pukerimu Clearing
Main
NEW ZEALAND
CALIFORNIA
Population
Area sq mi.
Greenwich Mean Time
11.30 a. m. Tuesday
4 p. m. Monday
SOUTH PACIFIC OCEAN
NORTH ISLAND
SOUTH ISLAND
TASMAN SEA
Bay of Islands
Trounsons
National Park
Kaipara Harbor
Hauraki Gulf
Great Barrier Island
Auckland
Coal mining area
Whakatane
Geysers
Huka Falls
L Waikare Moana
L Taupo
Mohaka Viaduct
Table Cape
Ngauruhoe (volcano) 7515
Ruapehu Mt 9175
Wanganui R
Cook Strait
Cape Farewell
Karamea Bight
Wellington
Rimutaka Incline
Cape Palliser
Cape Campbell
Wairau R
Clarence R
Hot Springs
Otira Tunnel 5.31 miles
Fox Glacier
Hakata R
L Tekapo
Franz Josef Glacier
Christchurch
Canterbury Bight
Milford Sound
L Hawea
L Pukaki
L Ohau
Wataki R
Southerland Falls
L Wakaka
L Wakatipu
L Te Anau
Dunedin
Invercargill
Foveaux Strait
Stewart Island
Melbourne 3595 miles
100 fathoms

and Wellington is provided by two overnight trains in each direction. On South Island, a daytime express connects Lyttleton and Invercargill. Provincial expresses use the North Island main trunk between Auckland and Frankston (85 miles) and between Wellington and Palmerston North (85 miles); and on South Island extra mail trains are run between Christchurch and Dunedin and between Dunedin and Invercargill. In addition to these there are many intermediate passenger and mixed train services, besides an extensive suburban service around the four main cities, particularly Wellington and Auckland. On an average weekday, 98 suburban trains leave Wellington and 54 leave Auckland.

Suburban trains on the Wellington-Paekakariki and Christchurch-Lyttleton lines, totaling 39 route miles, are electrified. Other suburban trains are powered by steam, tank engines being used. The only other electrified mileage at present is between Otira and Arthur's Pass on South Island, six miles, mostly through Otira Tunnel.

The problem of providing local passenger service on lightly traveled lines has been partly solved in the past few years by an increasing use of rail cars, usually operated by a crew of two men. They range in size from 25-foot four-wheelers seating 20 passengers to 67-foot combines carrying 52 passengers as well as mail and express. Between these two extremes is a third size, 50 feet long and mounted on six wheels, which carries 49 passengers.

Rail cars are powered by gasoline and Diesel engines. The small cars use a 95-horsepower six-cylinder Diesel, while the large cars use dual 130-horsepower Diesel engines driving through both trucks. The intermediate cars use 150-horsepower gasoline engines.

Two classes of travel are available to passengers in the railroad's bright red coaches. First-class fares run about 2½ cents a mile; second-class fares average 1½ cents. The main difference in the two classes is in seating space. Second-class coaches are arranged with double seats on each side of the aisle; first-class coaches have their aisles slightly off-center with two seats on one side and one on the other, providing roomier, more comfortable seating. Modern first-class coaches are air-conditioned and have three-position sponge rubber reclining seats. All coaches of recent construction are equipped with roller bearings.

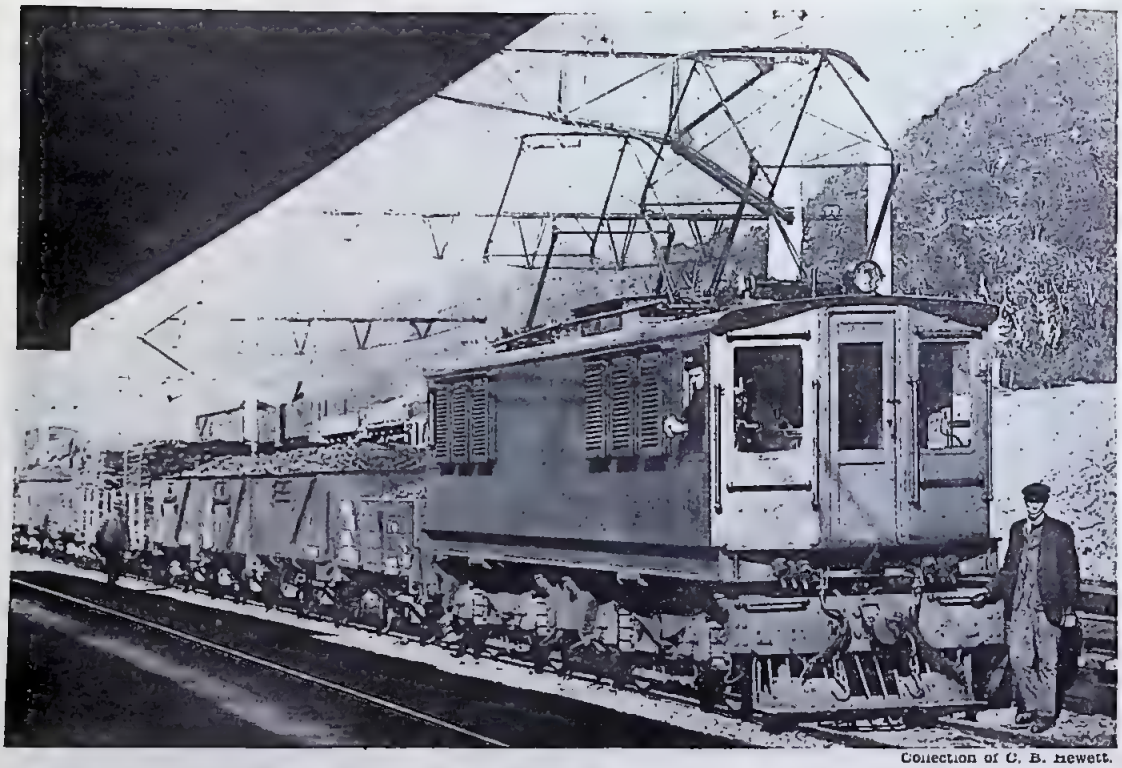
Dining cars are nonexistent. They were discontinued in 1917 and short meal stops at railway-owned refreshment rooms substituted. Sleeping cars provide 22 berths and the cost of occupying an upper or a lower berth is the same.

Couplers on most NZR rolling stock might be termed "semiautomatic" in that they couple automatically if cars are headed in the right direction. The coupler is shaped somewhat like a massive nailhead and is armed with a powerful hook, hinged to work up and down, which catches in a slot in the mating coupler when cars are pushed together. Since only one hook can be used for each two couplers engaged, the hooks are quickly interchangeable from one coupler to another and rules regarding them require that "all drawhooks must be placed so that they will be at the south end of rolling stock." These couplers apparently have been quite satisfactory, having been in use since the early 1870's, but they are now being replaced by Janney couplers on mainline passenger equipment. All mainline engines are equipped with adapters for either type.

The New Zealand Railways designed the world's first Pacific locomotive, which was built for use on the islands by Baldwin in 1901. This design well fitted the needs of the railroad, and many such engines are still running on the islands. The Ab class Pacific, introduced in 1914 as the standard express and freight locomotive, was the first locomotive ever to de-

A short goods train↗ descends Rimutaka Incline. Notice Fell engine and center rail. The two cars behind engine are special Fell brake vans to assist in retarding the train. A train puffs up the incline→ where grade is 6.6 per cent. Plans are under way to construct a tunnel which will replace the grade.

Top, J. D. Mahoney; bottom, Rail Photo Service, 93 Massachusetts Ave., Boston 15, Mass.



Collection of C. B. Hewett.

Electric locos are used through Otira Tunnel on the Christchurch-Greymouth line which crosses South Island. Tunnel ascends on a three per cent grade from west to east.

velop one horsepower per 100 pounds of weight. Another "first" in locomotive design is claimed by NZR, which was using Mountain locomotives four years before they appeared in the United States.

The Northern type is now used extensively in mainline passenger and fast freight service, running at speeds as high as 70 miles per hour with 19 coaches when conditions permit. This is not often, however, due to the tortuous, undulating character of the railroad. The Class K Northern has a capacity of 336 tons up Raurimu Spiral, steepest grade on the North Island main.

Signaling on the New Zealand Railways is safe but predominantly slow, although installations of modern color-light block signals are being made and some C. T. C. is in use in the heavy-traffic Wellington area. Most signals are of the mechanical semaphore type, giving two indications: horizontal. stop; 45 degrees in the lower quadrant, proceed. Special distant signals have fishtail blades and are permissive; "stop" permits the train to proceed at restricted speed.

Positive safety is assured between stations by use of the electric tablet system, which requires an engineer to have a token in his possession before proceeding to the next station. This usually requires a stop to pick up the token, although some stations are equipped to exchange tablets at speed.

Suppose we have an electric tablet machine at each end of section *AB*. *A* wants to send a train to *B*. By making co-operative movements on his tablet machine with the operator at *B*, *A* is able to obtain a tablet from his machine, provided there is no tablet already out of either machine. Each machine contains many tablets to allow for unbalanced working, but only one tablet can be out of the two machines at one time.

The new terminals at Auckland and Wellington have modern interlocking plants, the former being electro-pneumatic and the latter all-electric.

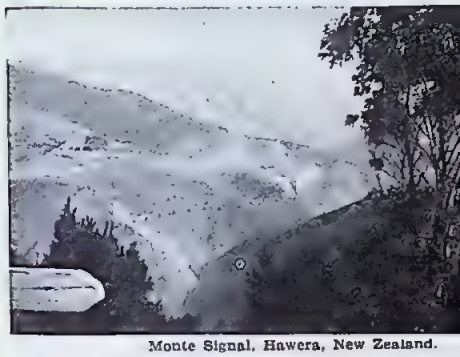
Communications are carried on easily and swiftly through telephone and telegraph over the entire system and teletype is used to some extent.

Topographic structure of the two islands is greatly responsible for a notable difference in the rail routes which traverse them. On North Island, the main trunk penetrates the heart of the island, going within a dozen miles of the central Ruapehu Peak. On South Island the main line hugs the East Coast, often within sight of the sea and never more than a few miles from it. Branch lines on North Island are often in the form of alternate routes, connecting at both ends with the main line, while on South Island the branches are long arms reaching inland.

For scenic variety, the North Island line is the better of the two. Leaving Auckland City bound for Wellington, we soon find ourselves gazing seaward as the train climbs from the city levels. We have glimpses of the glistening expanse of Waitemata Harbor, here a calm steel mirror, there a river of blue oil, great reclamation works on its southern side, green rounded hill cones and clustering white buildings along the north shore; steamships and white sails; the dark blue of the outer waters of Hauraki Gulf; the white cliffs of Motutapu and Motuihi topped

J. D. Mahoney.

A passenger train drawn by a modern streamlined locomotive threads its way through a cut in mountainous New Zealand. On the main line from Wellington to Auckland on North Island both terminal cities are at approximately sea level, but in between, the rails of the government road climb to over 2600 feet in three localities. Highest elevation on South Island is 2417 feet at Arthur's Pass.



Monte Signal, Hawera, New Zealand.

On the old line just outside of Wellington a passenger train climbs the mountains on a 3½ per cent grade. This part of the railway is now electrified.

J. D. Mahoney.

Wellington Limited in the electrified zone which serves Wellington's suburban area. Locomotive is a 4-8-2 type. Short post at left is an automatic tablet exchanger, part of signal system.

by dark groves and verdurous slopes; far beyond, the whaleback and ram-bow ranges of the outer wardens, islands and shadows of islands. Old Rangitoto, a perfectly circular mountain of lava, dominates all. In the foreground are the pretty homes and gardens of suburban dwellers, and the gentle undulations of the Remuera and Orakei slopes. Commanding all this garden and orchard land is Remuera Mount, which is seen on the left just after the train passes the busy station and shops at Newmarket. Remuera is one of the smaller volcanic cones of the Auckland plains.

The line continues well out on the plains of rich volcanic soil. The city and suburbs wane into country, and beyond Papatoetoe we are in the small-farm area. Papakura, which derives its name from the rich red soil of the level plain, is passed 20 miles from Auckland.

At Pukekohe Town, 31 miles from Auckland, we see a little white Presbyterian church on the high rim of an old crateral valley two miles to the east, and learn that it was a stockaded garrison in the early days when immigrants were fighting the native Maoris. For many ensuing miles we see signs of these old battlegrounds.

Seventy miles from Auckland is Taupiri, a beautiful spot of mingled mountain, river, and woodland scenery. Here the hills on both sides of the Waikato River become mountains and crowd each other — on the east, the graceful conical mount of Taupiri, nearly a thousand feet high; on the west, the high spurs of the Hakarimata Range. Our train runs close beside the shimmering waterway, bordered on its banks by graceful willows. We are told that Taupiri Mountain is sacred to the Maoris, in whose legends Taupiri is the mate of Pirongia Mountain farther south, and their daughter is Kawa Mountain.

Fifteen miles more and we are at Frankton Junction, where a line branches off to the east toward

Double-end tank locomotive with suburban train at Petone station in the Wellington commuting area. Many local trains link near-by towns with the city. Wellington is capital of New Zealand and has a population of about 99,000. Another 23,000 live in the suburbs.

J. D. Mahon

Hamilton, only a mile away, and on to eastern points. We continue southward on the main line and are soon in the King Country, where dairying, cattle raising, and wool and mutton growing have transformed a wilderness into a region of high prosperity.

Between Otorohanga and Te Kuiti, 114 and 126 miles from Auckland, we enter the limestone cave country. From our window we can see beautiful, fantastic landscape formations, but to see the caves themselves we must take a side trip by highway from Hangatiki station.

For 20 miles after leaving Te Kuiti we climb steadily, passing farms in various stages of cultivation, and here and there a sawmill. At Poro-o-Tarao (1128 feet above sea level and 146 miles from Auckland) we pass through a watershed divide by means of a ¾-mile tunnel and emerge on a mountainside overlooking the upper Ongarue Valley. From here it is a downhill run for 30 miles to Taumarunui, a descent of 650 feet. At Okahukura, shortly before we reach Taumarunui, a branch line leads off to the west.

We change engines at Taumarunui, for this is the beginning of the really mountainous section of the line. The powerful Class K 4-8-4 takes our train up into the forest country and the long winding pull to the Waimarino tableland, the western end of the great central plateau. Here, covering the headwaters of the Wanganui River, in a much-dissected region where a coating of pumice from ancient volcanoes overlies the soil everywhere, are large tracts of totara and rimu (red pine). This district has furnished much traffic to the NZR, and grassy fields mark the locations of earlier lumbering operations.

Before we reach the plateau, however, we encounter that engineering marvel which prompted us to take this trip in preference to another. It is the Raurimu Spiral, which winds the rails around and over themselves to gain 250 feet elevation while still within shouting distance of the Raurimu station. The rails rise two feet for every 100 feet traversed, at the same time curving to make a complete circle and two loops. The track plan is almost a perfect mirror image of Tehachapi Loop.

J. D. Mahoney.

This graceful 932-foot crescent-shaped bridge crosses the deep Hapuawhenua Valley three miles north of Ohakune.

High above Raurimu, at an elevation of 2647 feet above sea level, is Tongariro National Park, a region of grand volcanic mountainscapes. We see the Tongariro Range with its active volcano Ngauruhoe (7515 feet) and the perpetually ice-capped Ruapehu (9175 feet), highest point of the North Island and its only glaciated peak. Here in the park are also large lakes and forests and great expanses of subalpine meadow dotted with flowers.

Soon we cross two streams, both of which have become famous for the bridges by means of which the railroad spans them. The bridge across Makatote Stream was for some time the largest in New Zealand, 864 feet long and 260 feet high. The bush- and fern-fringed sides of the deep gorge are beautiful to our eyes, but we can imagine the engineers who laid out the railroad had little thought of beauty when they reached this sharply eroded channel. The second famous bridge, while longer than the Makatote (nearly 1000 feet), is only 147 feet high, and its fame comes not from its dimensions but from its shape. Built in the form of a crescent, it crosses Hapuawhenua Stream not far from the crossing of the Makatote.

Highest point on the railroad is at Waiouru, 242 miles from Auckland and 185 from Wellington. Here the line touches 2660 feet above sea level in a bleak, windswept tussock region in the midst of vast sheeplands. As we descend by a winding route toward the great upper valley of the Rangitikei River the scenery becomes more varied, with forest and hill and stream, and settlements are less scattered. A bright little river, the Hautapu, keeps close company with the rails for some miles as it cascades down to the Rangitikei.

Big railroad engineering works are features in the Rangitikei region of sudden ravines and steep ridges. Outstanding is Makohine Viaduct, a 750-foot bridge of steel latticework towers set on concrete piers in the bed of the stream 240 feet below.

Marton is a junction point with a line reaching northwest to serve West Coast ports and connecting with the branch we noticed at Okahukura. Our train speeds on, and soon we are at Palmerston North, largest (population, 25,260) inland city in all of New Zealand. The remaining 87 miles to Wellington lie in comparatively level farmlands, but mountain ranges are always in view, and before we reach our destination we will encounter several short tunnels in the rocky cliffs above the surf-beaten rough shingle beach which the railroad follows on the island's West Coast. This is on the double-track electrified section between Paekakariki and Wellington. As we emerge from the last of the tunnels we see Wellington spread out below, with its miles of curving seafront lined with wharves and shipping, and its houses climbing in tiers to the skyline 400 and 500 feet above the sea.

Only a few miles out of Wellington, on the line to Masterton, is the Rimutaka Incline on which the Fell locomotives and special brake vans do the toughest railroading job in the dominion. For three miles powerful little 0-4-2 tank engines take over trains, interspersed throughout the string of cars to pull, tug, and push. Their 32-inch drivers derive their power from 14" x 16" outside cylinders, while the inner horizontal drivers, driven by 12" x 14" cylinders, squeeze tight on the middle rail to add their tractive force.

Load limit for each engine over the 6.6 per cent grade is 73 tons; for a train, 280 tons. Ascending trains are limited to six miles an

J. D. Mahoney.

Top: One of the 50-passenger Diesel rail cars used for express service in various parts of North Island. These cars are named after famous ocean-going canoes which it is believed brought the Maoris, or native Polynesians, to New Zealand from Tahiti some 600 years ago. Above: Typical electric train used in the Wellington area. Below: Fell tank engine used on the Rimutaka Incline near Wellington. Fells are the only locomotives with outside frames on the New Zealand Railways. Bottom: Baldwin-built Pacific with Waikato spark arrester.

W. W. Stewart, Hugh Bennett

hour, while descending trains must travel no faster than 10 miles an hour. In addition to Westinghouse brakes throughout the train, each Fell locomotive is equipped with four large brake shoes which clamp down on both sides of the center rail, and the Fell brake vans, similarly equipped, are scattered throughout the train at 50- to 60-ton intervals. Each descent of the grade wears out all brake shoes.

Freight trains making the trip over the incline consume about 80 minutes in the process, including changing engines and distributing the brake vans throughout the train. The one steam passenger train which is still operated over this line requires 42 minutes. Two daily Diesel rail cars negotiate the incline in 16 minutes.

Severe winds in this area have been known to blow trains off the track, and this, together with the other difficulties of operation, has resulted in plans for the elimination of the incline by tunneling five miles through the Rimutaka Range. This will eliminate 11 miles of track and 692 feet of climb.

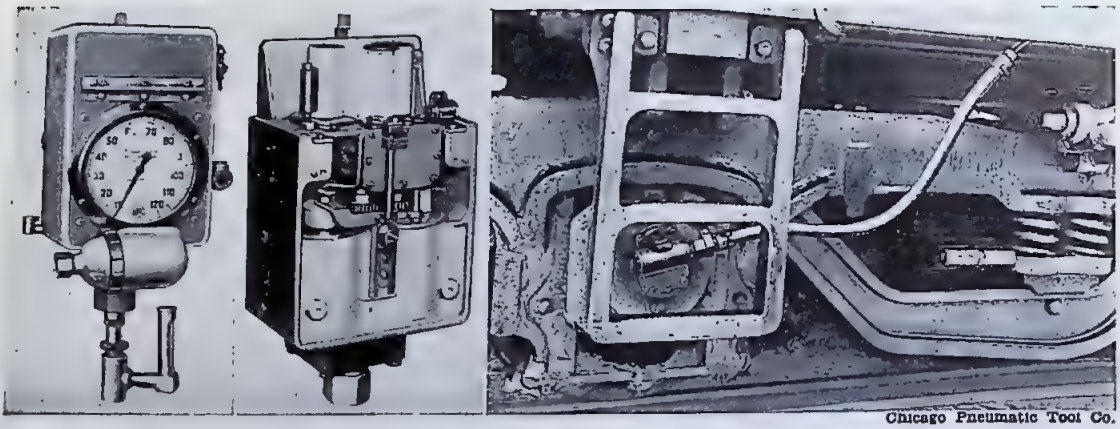
New Zealand Railways are a strange mixture of English, American, and native practice. Freight cars are definitely English, and, as in England, they are called "goods wagons." Passenger cars follow American lines, with the center aisle running the length of the car. Recent motive power has an American look; older engines look both American and English in some respects. Semaphore signals look English; the newer color-light signals might be found on an American road. All station platforms are at car-floor level, as in England. As in the mother country, engineers are "engine-drivers," conductors are "guards," and coaches are "carriages."

But typically native in origin are the Pacific and Mountain locomotives, which New Zealand pioneered and developed; the refrigerator cars, which New Zealand created to open new markets for its beef; the grating-floored stock cars which speed the shipment of sheep. They may be of English appearance, or of American; but basically they are just as New Zealandish as the government's policy of building new lines to open new territory, let the profits fall where they may.

W. W. Stewart.

This Garratt↗ was built in Manchester, England, by Beyer-Peacock about 1927. Three of these 4-6-2+2-6-4's were operated on the New Zealand Government Railways, but their maintenance costs were excessive and they were not considered satisfactory. The long unwieldy engines weighed 327,040 pounds and had a tractive force of 51,580 pounds. A few years ago the Garratts were rebuilt into six Pacifics. The famous Class K locomotive↙ is used in heavy passenger and fast freight service. Some have been semistreamlined↘ by adding a shroud. From 1932 to 1937, 30 of these 4-8-4's were built at the Hutt Shops and during the last couple of years five more have been added with some modification in original design. Bottom: Mountain type, said to have originated on the Government Railways and used extensively on heavily traveled lines.

W. W. Stewart, Hugh Bennett.



Chicago Pneumatic Tool Co.

One type of speed recorder showing dial, inner mechanism including paper tape, and angle drive unit used on Diesels.

Speed Recorders

By means of speed recorders placed in the cabs of locomotives, the operating department of a railroad can ascertain at what speed a train was operated over any point on its run. The record is made by a pencil which draws a continuous line on a roll of paper as it slowly moves in the machine — a half inch of paper representing one mile of railroad in a high-speed recorder or five miles of railroad in a low-speed recorder. The machine also has a dial which indicates speed to the engineer. Because the device is operated by a friction measuring wheel rolling on one of the driving wheels, wheel slippage is also recorded by the machine.

Operation of one type of recorder is by means of a hydraulic pump actuated by a flexible drive shaft from the measuring wheel on the driver. As speed increases, the output of the pump also increases in direct proportion, causing the vertical paper tape to move faster while a weighted plunger lifts the recording pencil higher on the tape. The tape is graduated into broken horizontal lines, each line representing (on a high-speed recorder) 10 miles per hour and each break in the lines representing a mile of operation. Most types of recorders are electrically operated but otherwise work on the same principle.

Hot Journal

If you are the engineer or conductor of a train and you see a man by the wayside holding his nose with one hand while he points to the ground with the other, it means that your train has a hot journal. The signal is in the book of rules, and train and engine crews are continually on the lookout for such signals.

On the Boston & Maine and the Maine Central, the rule was changed recently. Anyone seeing a hot journal on a train must give a stop signal instead of the conventional sign, whereupon the conductor pulls the air and brings his train to a stop. The conductor is generally the man to stop the train because by the time the hot journal is discovered the engineer is usually out of sight.

On a freight train the conductor tries to time his stop so as not to block any crossovers. This is hard to do with the conductor's valve in the caboose and still come reasonably near a place where the hot journal can be set out if necessary, so occasionally, after the stop is made, the train has to be moved. This generally means quite a delay on long trains not equipped with train radio communication, as word has to be passed to the engineer to tell him what to do.

Even if the engineer knows he has a crossover blocked, he cannot move on his own authority because he usually does not know why the stop was made. A pair of wheels may be on the ground, for all he knows. If it is an important interlocking that is thus blocked, the whole railroad may have to wait.—*G. W. O'Connor.*

Safeguarding a Nonstop Run

When the Burlington Route's *Pioneer Zephyr* made its famous nonstop run from Denver to Chicago on May 26, 1934, extensive preparations were made for its passage all along the line. Special guards were posted at unprotected highway crossings, and crossings with gate protection were closed many minutes in advance. Switches were spiked. The entire 1015 miles of railroad between the two cities became the private property of one train. Attaining an official maximum speed of 112.5 miles an hour, the Zephyr made the trip in 13 hours 5 minutes to average 77.5 miles an hour.

Long after *Zephyrs* had been placed in regular service between Chicago and the Twin Cities, crossing gatemen closed the gates at the first sound of their air horns, even before the bell in their shanties tinkled to denote the approach of a train.

Train-and-Dog Newspaper Delivery

A few miles west of Hyndman, Pa., on the Sand Patch grade of the B&O, a trackside resident receives newspapers on alternating days through the combined efforts of his dog and the crew of No. 9, the *Washington-Chicago Express.* Engineer L. H. Grant gives a couple of short toots on the whistle and the dog comes running down the mountainside. Brakeman Dutch Emhoff heaves the bundle of papers off the rear of the train; the dog picks them up and takes them home. On days when a different crew is in charge, the dog doesn't bother to meet the train.

Paoli Local, 1908

The Paoli Local [February TRAINS] was not always electrified. In its earliest days it was drawn by horsepower, then, for more than half a century, by steam. Although the "Main Line" was four-track in 1908, as it is now, some changes other than electrification have taken place since that year, when this photograph of the station at St. Davids was taken. Lower-quadrant semaphore signals have given way to color-light signals, station platforms have been lengthened, and the water tower in the background is no longer needed. The schedule has been speeded up by nine minutes between Philadelphia and St. Davids. Now M. U. cars have replaced the Class E-2a 4-4-2 shown in the photograph, which is from the collection of George B. Ritz, 1351 Fillmore Street, Philadelphia.

It's here—a new convenience on the C&O

NO TIPPING

of any C&O employee*

WHY should you—the paying customer of the railroads—have to shell out for so many of the ordinary services you need when you travel?

Why shouldn't your rail ticket entitle you to courteous personal service—without extra charge?

The Chesapeake & Ohio does not believe the travelers on its railroad should have to tip—and is taking the first step toward abolishing this nuisance. *From now on, you are urgently requested not to tip C&O employees for any of the services they perform.*

This means you won't have to leave a tip on the change tray when you eat on a C&O diner. It means you won't have to dig down for change for the porters who serve the coaches on C&O crack trains.

We cannot extend the no-tipping rule to union terminals shared by the C&O with other railroads, since the redcaps in these stations are not on our pay roll. Nor can the no-tipping rule apply on Pullmans, since the porters are employed by the Pullman Company—not by us.

But wherever C&O employees are on hand to serve you, you'll find no outstretched palms—for we'll compensate these employees directly for attending to your needs.

This move to end the tipping nuisance is the latest, but not the last, of many improvements in rail travel offered by the C&O.

***Naturally, this does not apply to Pullman porters, or to redcaps in union terminals, since they are not C&O employees.**

CHESAPEAKE & OHIO RAILWAY

TERMINAL TOWER, CLEVELAND 1, OHIO

Round Trip to the Moon

• A ton of freight to the moon and back! That's one good way to measure the freight moved by American railroads in 1946 for *each* of the men and women on the railroads' payroll.

Working alone—with his bare hands—each one of these railroaders would have accomplished little. But working together and equipped with the right tools—cars and locomotives, tracks and stations, signals and shops—the immense job was handled efficiently and dependably. And it was done at a cost to the nation's shippers averaging only one cent for hauling a ton one mile.

To provide these essential tools, there has been invested nearly $20,000 per worker, furnished almost wholly by private funds. To improve these tools, there must be still more investment—which cannot be expected to continue unless railroads have a chance to earn reasonable profits on these funds.

But during the past twenty-five years—through boom years, depression years and war years—the railroads have averaged a return on their net investment of only 3¼%.

In 1947, even with the increased rates recently authorized by the Interstate Commerce Commission and with freight traffic continuing at its record-breaking peacetime level, railroads will probably earn only about half the 6% return which nine out of ten people think is no more than a fair profit, and which is necessary to attract continued investment in these essential railroads.

ASSOCIATION OF **AMERICAN RAILROADS** WASHINGTON 6, D. C.

IN PARTNERSHIP WITH ALL AMERICA

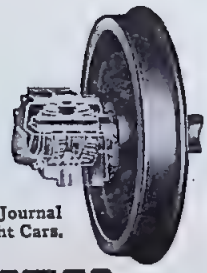
CHESAPEAKE AND OHIO SPECIFIES

1000 70 TON CAPACITY

HOPPER CARS

ON TIMKEN ROLLER BEARINGS

This will be the largest quantity of roller bearing equipped freight cars ever built.



Timken Roller Bearing Journal Box Application For Freight Cars.

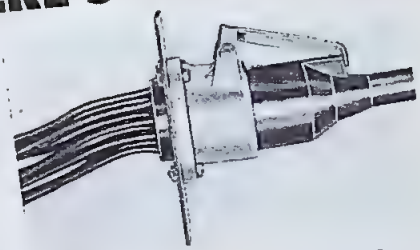
TIMKEN

TRADE-MARK REG. U. S. PAT. OFF

RAILWAY ROLLER BEARINGS

THE TIMKEN ROLLER BEARING COMPANY, CANTON 6, OHIO

HERE'S SOMETHING



The Old-Timers MISSED!

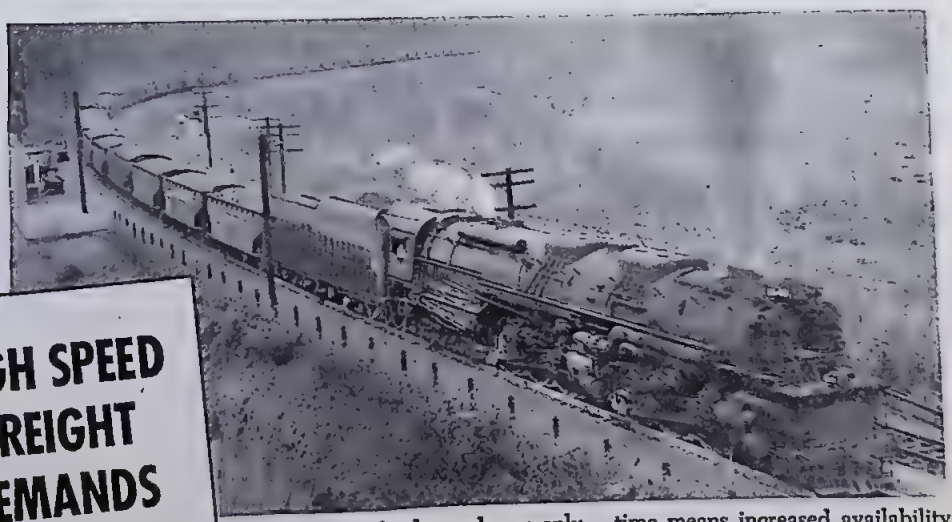
Back in '04 inter-car communication wasn't even considered! But today . . . it's just one of the many facilities that insure maximum passenger comfort and safety on our modern streamliners.

Weather sealed for perfect inter-car transmission MINES Molded Rubber Connectors, Jumpers and Receptacles are designed to the tempo of this modern trend. Our Railroad Bulletin RY-103 describes MINES Standard Railroad Connector Line fully.

WRITE NOW !

MINES EQUIPMENT COMPANY

4237 CLAYTON AVE. MINES ST. LOUIS 10, MO.



HIGH SPEED FREIGHT DEMANDS

emphasize the need for modern power

Today's freight demands can only be met through a maximum of operating efficiency . . . operating efficiency that is backed up by MODERN motive power, capable of hauling increased loads at higher speeds. Reduced running time means increased availability . . . and increased availability means increased revenues. Lima-built modern steam locomotives have shown what modern steam power can do to decrease running time and increase availability and freight revenues.

LIMA LOCOMOTIVE WORKS LIMA LOCOMOTIVE WORKS INCORPORATED INCORPORATED, LIMA, OHIO

RUNNING EXTRA

Howard (ETAOIN SHRDLU) Luhring sets most of the type used in TRAINS. The machine at which he is pictured is a Model 31 Linotype equipped with four fonts of type, any one of which is instantly available for use merely by cranking it into position. Other fonts are also available, but their use involves hand-changing of the magazines in which they are stored.

With this machine Howie sets all type from the small 5 point used for our picture credits to the 14 point which is used for subheads. All told Howie can set 32 different type faces from his supply of matrices.

Setting type on a linotype is far from being as simple as using a typewriter. Besides cranking the right font of type into operating position, there are six other adjustments to make, or check, before the machine is ready to go to work. And in spite of having 48 more keys than a typewriter, there are times when it is necessary to drop a character into the line of assembled matrices by hand.

The intricate workings of a Linotype machine could hardly be expounded in a column as limited as this. Suffice it to say that when Howie punches a key, a matrix or die drops from the magazine into the assembler. When a whole line of characters has been assembled and properly spaced, it is transferred to the casting position, where molten type metal is forced against the matrices. The solid line of type is ejected into the "stick" next to Howie's left knee in the picture, and the matrices are automatically distributed into the proper channels of the magazine, ready for re-use.

Sometimes, as with all machines, things go wrong with the Linotype, and it is then that Howie really shows his skill. It takes more than a knowledge of the keyboard to be as competent an operator as is Howie Luhring. Yet Howie has time for outside activities, among them being the guiding light behind the Stefan-Howard Co., which markets a fireproof oven pad of Howie's own invention at three for $1. Howie says these oven pads will make the Little Woman so happy she'll be glad to let you go on that next fan trip.

Railroad

New Data on N&W Engines

Some changes have been made in the principal dimensions of the Norfolk & Western locomotives as described in April TRAINS. No J locomotives now have boosters; tractive force is 80,000 pounds. Weight on leading truck is 101,600 pounds; on trailing truck, 104,400. Tender capacity, coal, 35 tons; water, 20,000 gallons. Evaporative heating surface of Class A is 6650 square feet; tender coal capacity, 30 tons. The Y-6 has 58-inch drivers; tender coal capacity is 30 tons.

R. G. Henley, Gen. Supt. Motive Power, N&W, Roanoke, Va.

Not Apache Canyon

As a result of your reproducing one of Howard Fogg's paintings in the February issue of TRAINS, we have had a number of letters from people wanting to know where Apache Canyon is. Could you tell your readers sometime that Howard, in doing this painting, meant the locale to be only typical of the Santa Fe scenery in Arizona or New Mexico? He did not endeavor to pinpoint it to a particular spot.

George Mason, Director of Information, American Locomotive Co., 30 Church St., New York 8, N. Y.

[If the canyon in the painting were a little narrower and if there were one track instead of two, it would resemble Apache Canyon more closely. Apache Canyon is between Rowe and Canyoncito, N. M., about 70 miles eastward from Albuquerque. — *Ed.*]

How to Use Optional Routes

I enjoyed William Forsythe's "How to Use Optional Routes" [April TRAINS], but I wonder how the Nickel Plate hauls its passengers on the five optional routes he mentions between Frankfort and Fostoria. Nowadays it will be by freight train over four of these, as the only passenger trains in the Frankfort-Fostoria district are Nos. 9 and 10, the night trains between St. Louis and Cleveland, and Nos. 21 and 22, day locals between Peoria and Fostoria. All run directly via Tipton, Muncie, and Lima.

John H. Schmidt, 550 Arlington Pl., Chicago 14, Ill.

[As Mr. Forsythe pointed out, even a railroad traffic man (Forsythe) has trouble keeping up with route changes. In many cases obsolete rates continue to be published for special movements, such as troop movements during the war. — *Ed.*]

Wants Pictures Dated

How about putting in the approximate date a photo is taken, when it obviously is an old one? Specifically, I refer to the picture of the CPR *Dominion* on page 12 of the March issue. I dare say fair-minded readers will note by the appearance of the head-end equipment (wood) and the locomotive, as well as that of the automobile at the station, that this must have been taken some time ago. In fact, it hardly looks like the *Dominion* at all — but correct me if I appear to think you are being patronizing.

J. Stephen Stephens, Rm. 35, 204 Notre Dame St. W., Montreal 1, Que.

[A fair criticism, Mr. Stephens. In this case, the date of the photo was unknown, but as you point out, it obviously is an old one. However, photographers are urged to date their photographs. The date will become a valuable piece of information a few years hence. — *Ed.*]

Hamtramck, Mich.: City Without a Depot

What is the largest city in the United States without a railway passenger depot? Biggest I know is Hamtramck, Mich., an independent municipality of some 60,000 persons completely within the corporate limits of Detroit. It has no station, although both the Michigan Central and Grand Trunk run completely through the town. The nearest passenger depot is the Milwaukee Junction stop on the Grand Trunk about two blocks from the city limits of Hamtramck.

Thomas Dworman, 19545 Shrewsbury, Detroit 21, Mich.

Mail

Southern Pacific Narrow Gauge

The article in March TRAINS about the Southern Pacific narrow gauge was outstanding. . . . I am enclosing a picture of Tonopah Junction as it appeared recently with sand drifted over the track. This is where the narrow gauge railroad over Mt. Montgomery branched from the standard gauge Tonopah & Goldfield (now abandoned), both lines running on the same ties from Mina, where the combined roundhouses for the railroads of both gauges were situated.

Loren S. Ayers, R. F. D. 1, Box 183, Santa Paula, Calif.

. . . Attention Lucius: Weep not yet for the last of the California narrow gauges. High in the Sierras you can still see a snake back trail that is busy nine months of the year hauling raw housing out of California's forest. Come up and see our 90 miles of narrow gauge, all Shay-powered: the West Side Railroad. We have two other short lines, the Sierra and the Pickering, both standard gauge.

E. Beales, Tuolumne, Calif.

. . . The Southern Pacific narrow gauge now has only two locomotives, Nos. 9 and 18. Nos. 8 and 14 which Mr. Beebe mentioned are both being used as stationary boilers on the SP now, the 8 being at Plaster City, Calif., and the 14 at Colfax. Another engine which was taken away earlier, possibly No. 22, is also serving as a stationary boiler at Eugene, Ore. All narrow gauge cars were recently renumbered, box cars and tanks from 1 to 99, gons in the 100's, flats in the 200's, side-dump gons (only a few) in the 300's, and the few combines in the 400's. One of the mechanics at Keeler told me, "We got so bawled up in our numbering that we decided to start all over again."

Stan Kistler Jr., 2106 Gladys St., Pasadena 8, Calif.

A Gentleman After Our Own Heart

While steam and smoke delight and thrill me, I still want a monthly record of railroading's progress. And if, to cover all the news, you feel justified in picturing an "oil engine," go right ahead! TRAINS is a magazine devoted to *railroads*, and its general appeal is due, in no small measure, to its very fine general portrayal of the American railroading scene. Picayune arguments and narrow-minded loyalties blind the contestants to the romance and drama of trains and tracks. Please do not be swayed by the almost neurotic mouthings of the rabid steam fan (or juice or Diesel, for that matter). I am sure that the majority of your readers will concur when I say there is hardly room for improvement in the editorial and pictorial content of TRAINS as it stands.

Edgar R. R. Warner, 175 W. 188th St., New York 63, N. Y.

[Thanks, Mr. Warner, for your compliments and for a perfect statement of TRAINS basic editorial policy. — *Ed.*]

Tail-End Picture Collector

I have a hobby of collecting pictures of name train observation cars, particularly those carrying target signs, and wonder how many photo fan readers would like to swap pictures with me? Mine are snapshots, not professional.

E. F. Hunter Jr., 2807 Washington Ave., Santa Monica, Calif.

SECOND SECTION

We like running TRAINS. It would be just too bad if we had to quit this pleasant job and go to work. So we are very pleased with the almost unanimously favorable reception of our 35-cent price. For the first time in its 6½ years TRAINS is not losing money. Instead of cutting down on the contents and quality we now have credit and courage to go ahead with improvements.

The additional text and photos in the last few months are only a beginning. We have something bigger in the works, something which takes time. With the November issue this fall TRAINS will be improved more than at any other time since it started. Look for this November issue. And please remember: We like running TRAINS. For nearly seven years now we've kept the magazine going at a loss simply because we're nuts about railroads. Whatever the circumstances, whatever the inflated price of paper and engravings, you can always count on us to give you a plenty good money's worth. The better the magazine we publish, the more satisfaction we get out of it. And the more reading enjoyment there is for you.

* * *

A magazine is never old until you've read it. Here are some back numbers of Trains which may be new to you:

1941 — July.
1942 — July.
1943 — March, April, May, September, October, November, December.
1944 — All issues except January and February.
1945 — June, November, December.
1946 — All issues.
1947 — January, February, March.

All these numbers are available at 25 cents each, postpaid.

Also available are bound volumes No. 5 and No. 6 of Trains. These each contain 12 issues in monthly sequence, neatly and durably bound in cloth and indexed. Per copy, either volume, $5 postpaid.

Vol. 5 — November, 1944-October, 1945.
Vol. 6 — November, 1945-October, 1946.

* * *

We're glad to say we're catching up in our subscription department. Following the marriage of Margot ("Running Extra," March TRAINS), she went to live on the West Coast, too far away to be of help to us. At first we had a time keeping up with things. To make matters worse, the trained girl who replaced Margot has a husband who doesn't want her to work, and the week after Margot left he set his foot down. Lorraine must quit working, he said. And that's the story behind our temporary tie-up in the subscription department. We're doing better now, and it shouldn't be long before we're entirely caught up.

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Kobel Feature Photos, Frankfort, Ind.

When the county seat of Box Butte County, Neb., was moved from Hemingford to Alliance in 1899, the Burlington & Missouri River Railroad (Burlington Route) was called upon to move the 48 x 52-foot courthouse which had been erected at Hemingford eight years before. The task was accomplished by balancing the frame building on two trucks and anchoring it, front and rear, to two loaded 60-ton coal cars. Thus arranged, the sturdy little Consolidation locomotive moved the building cautiously over the 19 miles of track between the towns.

41,500 Trains a Day

Although, like hogs, passengers can now cross the country without changing cars at Chicago, there is still one point disciples of Robert R. Young have overlooked: Hogs and other freight have better frequency of service throughout the country than do passengers. Every 3.6 seconds, day and night, a freight train somewhere in the United States starts its run. Passengers must wait 4.9 seconds between trains. These figures are based on operations in 1943, when, according to estimates, 17,500 passenger trains and 24,000 freight trains were run daily.

Piston Packing

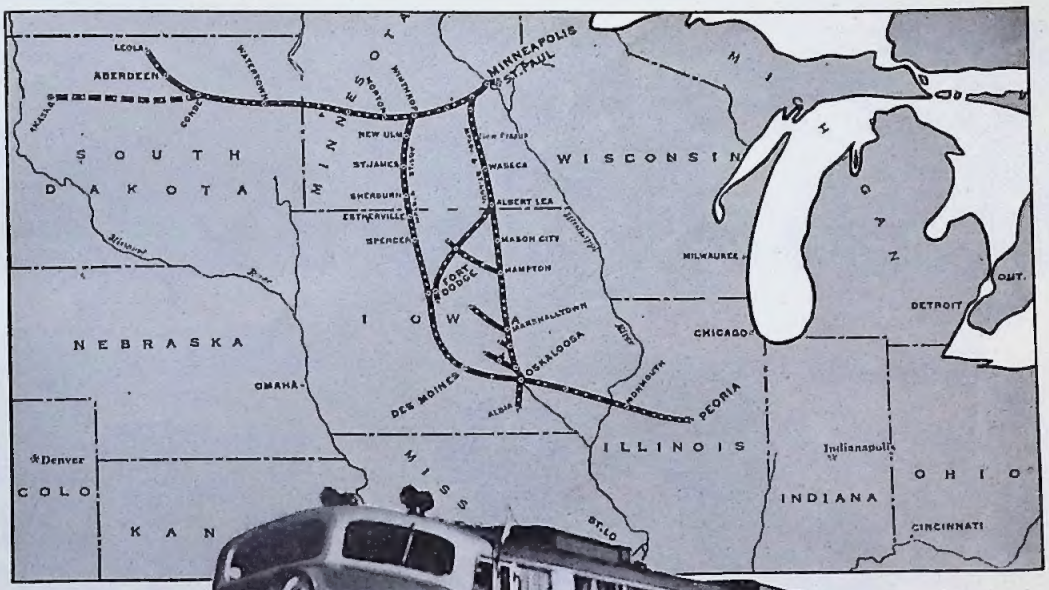
Because it is not practicable to make a steam-tight sliding joint between the piston rod and the end of the cylinder from which it projects, a comparatively soft packing is used around the rod to prevent steam from leaking out of the cylinder. The packing is wrapped snugly around the rod in perhaps six or eight rings held in position by a cup through which the rod slides. A packing nut provides means of adjustment to compensate for wear. Leaky cylinder packings on a locomotive are a Federal offense — not because the government worries about how much fuel the railroads use, or waste, but because if a cylinder is leaking badly the engineer or fireman cannot see ahead properly. — G. W. O'Connor.

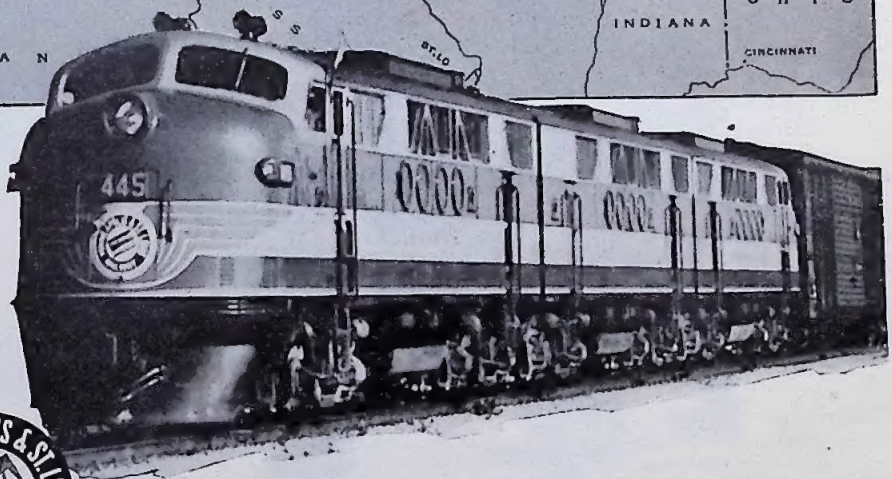
Are Railroads Morally Reprehensible?

In its fiscal policy toward transportation, the government treats railroad service in much the same discriminatory way that it treats whisky in excise taxation. Both railroad service and whisky have been given arbitrary financial burdens to carry, which apply to them alone and not to their competitors, with the result that customers are artificially discouraged by the prices of whisky and railroad service from purchasing as much of either of them as they would like and, instead, are induced to seek competing substitutes. A laudable social purpose is, no doubt, served when a tax of $9 per gallon on whisky and of only 25 cents per gallon on beer results in discouraging the consumption of whisky in favor of beer. But what is there so morally reprehensible about railroad service which can excuse similar government action to inflate the relative price of rail service, driving traffic to substitute types of transportation? — *Railway Age.*

By use of the Lidgerwood method of locomotive tire turning, Southern Pacific has cut out-of-service time for this type of repairs to one-tenth. Tire turning used to require dewheeling of the locomotive and the use of giant lathes. Locomotives with four pairs of drivers were out of service five days. Now, using Lidgerwood↓ to pull the locomotive back and forth over well-ballasted track↙ on a slight grade, cutting tools are substituted for brake shoes on the locomotive and the complete turning job can be done in nine hours. Four men are needed for the process.

J. E. Turner, 1915 Grant St., Berkeley, Calif.





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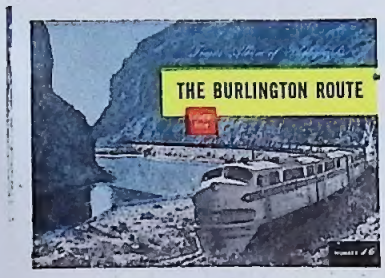

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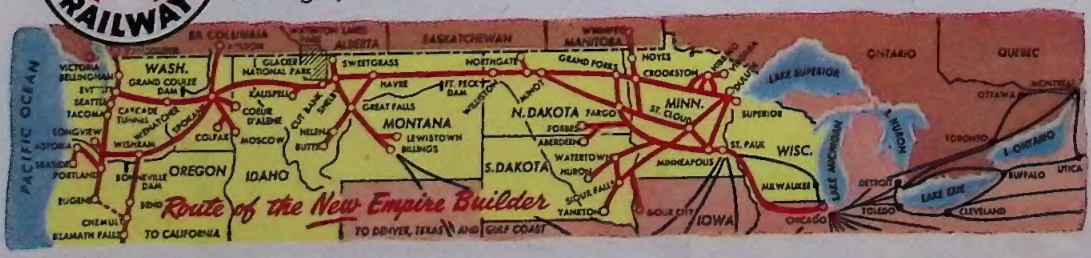
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